VT 22A Truck Route Study
Addison County, Vermont

Final Report

Stantec

Prepared for:

Addison County
REGIONAL PLANNING COMMISSION

Addison County Regional Planning Commission

VTrans Working to Get You There

Vermont Agency of Transportation

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DISCLAIMER

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VT 22A Truck Route Study

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1.0 EXECUTIVE SUMMARY

The Addison County Regional Planning Commission (ACRPC) in partnership with the Vermont Agency of Transportation (VTrans) retained Stantec Consulting Services, Inc. and Adamant Accord to evaluate the feasibility and preference for alternative truck routes to VT Route 22A through the City of Vergennes, Vermont. Strategies were explored to mitigate the safety, traffic operations, noise, dust and vibration impacts of the up to 800 trucks per day, mostly tractor trailers, passing through the historic city center. A portion of the trip through the city center is made on an 11 percent grade. The three principal alternatives considered are as follows:

- **VT 22A Truck Route.** VT 22A would continue to serve as the primary truck route. Modifications would be made along the existing VT 22A alignment within Vergennes to better manage traffic flows for all travel modes.

- **New Alignment Truck Route.** A road would be constructed on a new alignment within the City of Vergennes north and west of downtown. The new roadway would be open to all traffic and through trucks would be restricted from passing through downtown Vergennes.

- **VT 17 Truck Route.** Through trucks travelling on VT 22A would be diverted to VT 17 between VT 22A and US 7. VT 17, including major intersections, would be reconstructed as necessary to safely accommodate increased truck traffic.

The alternatives were evaluated with respect to a wide range of factors including project cost, quality of life impacts, economic impacts and feasibility.

At the conclusion of an extensive outreach process managed by the ACRPC that engaged stakeholders from Vergennes and neighboring communities, further consideration of the VT 17 Truck Route alternative was rejected. A decision was made to implement much of the recommendations within the VT 22A Truck Route alternative as part of a pending VTrans roadway resurfacing project. Additionally, stakeholders at the final public hearing for the project overwhelmingly agreed to pursue development and implementation of the New Alignment Truck Route alternative.

1.1 ALTERNATIVES

The three alternatives evaluated were broadly defined by the ACRPC at the beginning of the study. The consultant team developed the alternative plans in greater detail to allow for a thorough and meaningful evaluation of each. The VT 22A Truck Route alternative, identified as Alternative A in the study, included traffic control improvements, traffic calming measures and enhanced pedestrian and bicycle accommodations along VT 22A in Vergennes. A plan sheet illustrating typical improvements proposed for a downtown roadway segment is shown in Figure 1-1. A proposed alignment for the New Alignment Truck Route alternative, Alternative B, is shown

in Figure 1-2. The new roadway would be approximately two miles long, a minimum of 32 feet wide, have a 45-miles per hour design speed, and span the Otter Creek on a 900- feet long bridge. Alternative C, the VT 17 Truck Route, would involve widening, reconstruction and/or realignment of 7.5-miles of VT 17 between VT 22A and US 7. Assumed upgrades along VT 17 are noted in Figure 1-3.

Figure 1-1 Representative Treatments for Main Street Under Alternative A

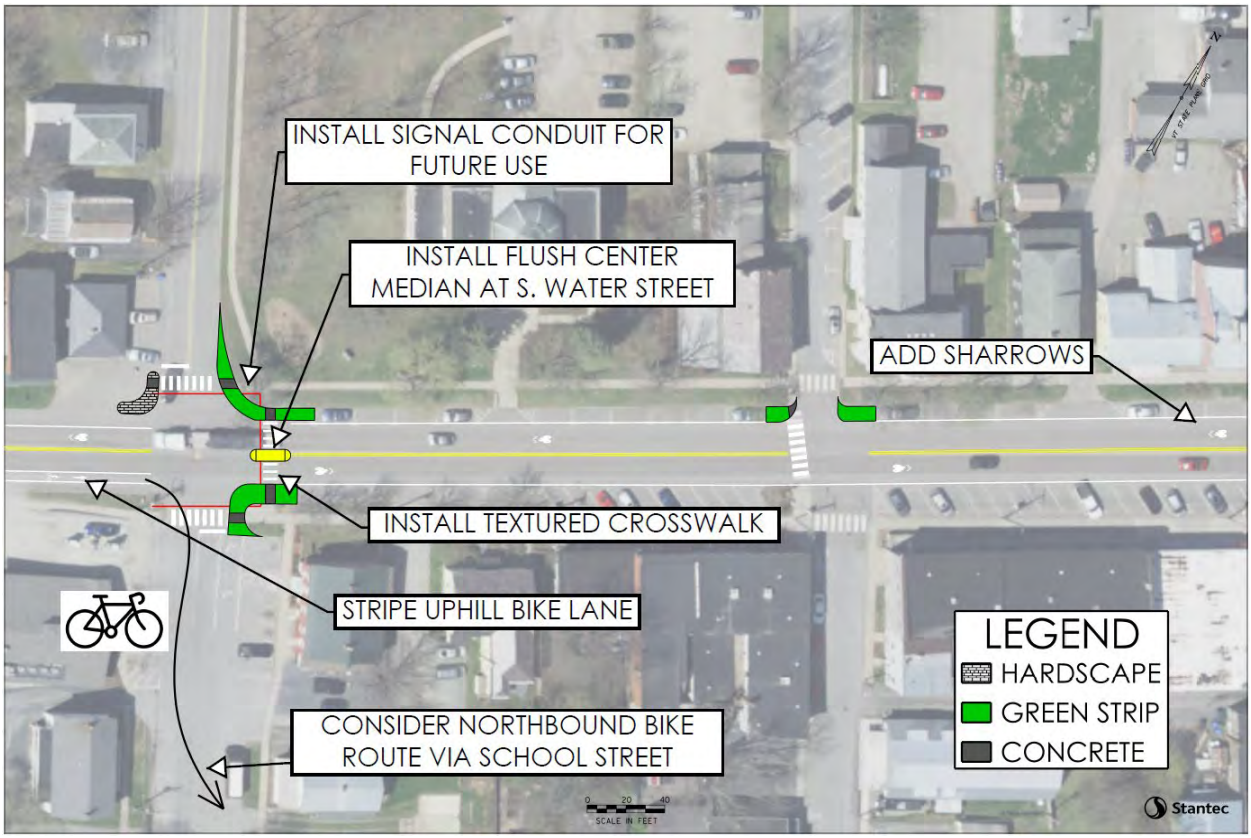


Figure 1-2 Possible Alignment for the New Truck Route – Alternative B

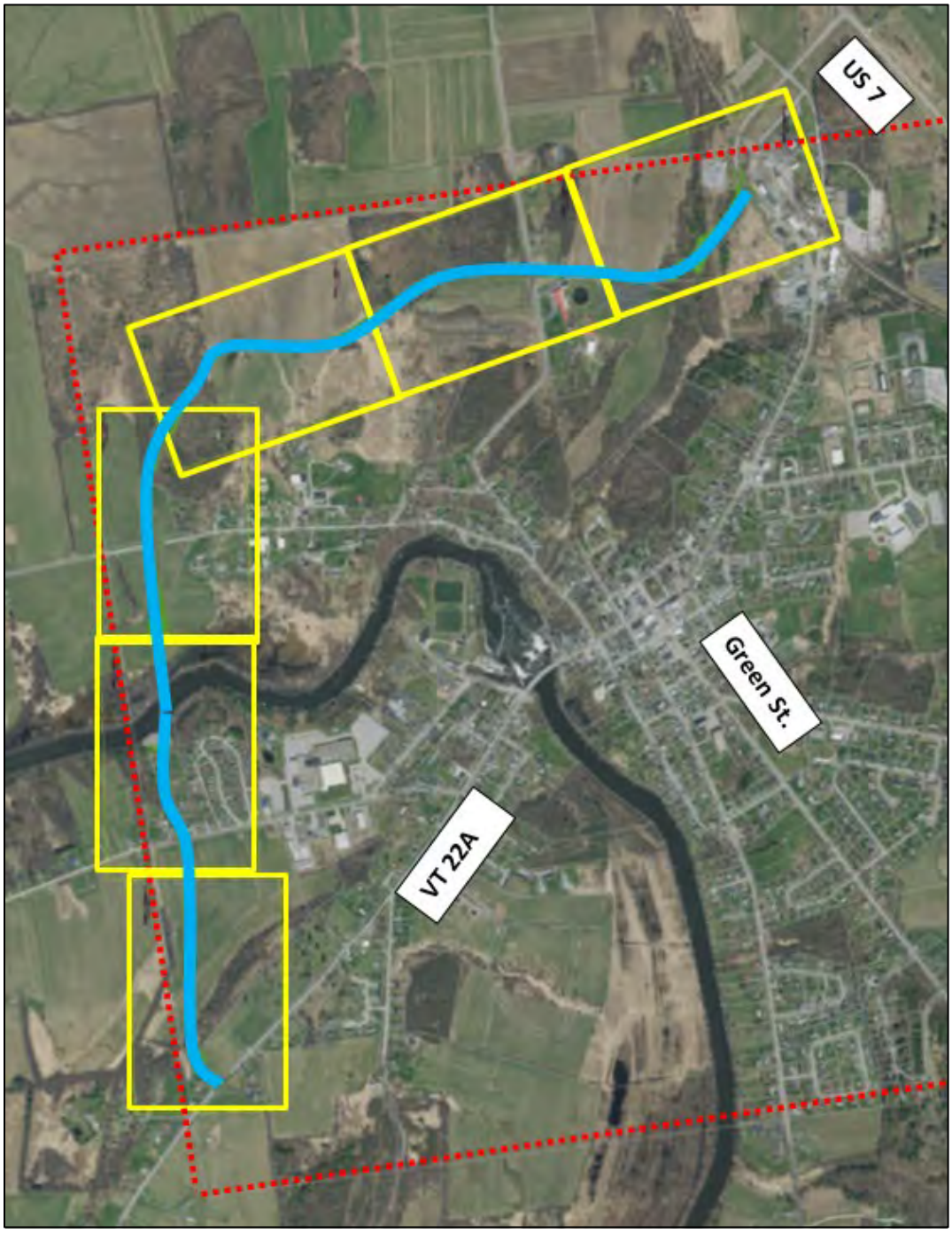
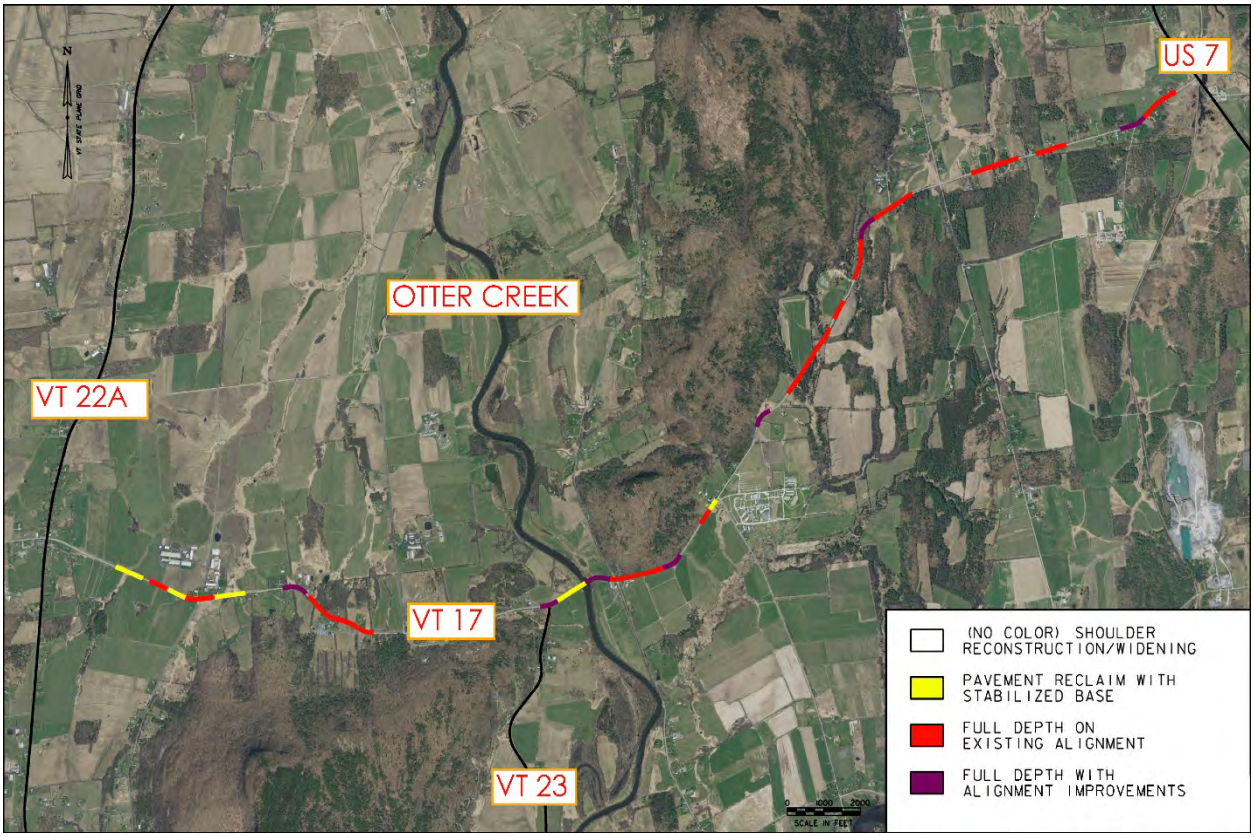


Figure 1-3 Proposed Treatments for VT17 – Alternative C Concept Plan



1.2 EXISTING CONDITIONS

An existing conditions database was compiled to aid in developing each alternative and assessing their feasibility. Collected data included: roadway geometry and traffic controls; vehicular traffic volumes; roadway intersection operations; vehicular crash history; land use conditions; economic factors (land values, associated property taxes and retail/restaurant sales); and, environmental/historic resources. These investigations confirmed the magnitude of the truck issue in downtown Vergennes and helped define the opportunities and constraints associated with the alternatives considered. Overall, it was found that there were significant opportunities to enhance pedestrian and bicycle accommodations in the downtown area ranging from the addition of pedestrian controls and pedestrian signal phases at the existing signalized intersections to the provision to on-street bike lanes. Environmental and historic resources identified along the New Alignment Truck Route and along VT 17 helped define project permitting and mitigation requirements. VT 22A in downtown Vergennes was identified as a High Crash Location such that proposals to reconstruct the roadway and improve safety or to divert traffic to alternative routes would have positive safety impacts.

1.3 PURPOSE AND NEED

A Purpose and Need Statement was developed and used to measure the performance of each alternative. The project purpose was defined as:

> "Enhance the economic vitality and quality of life in downtown Vergennes by reducing the noise, vibration, fume and dust impacts of truck traffic while:
>
> - Maintaining a high level of service for the movement of freight in the region;
> - Minimizing and/or mitigating traffic impacts to other transportation corridors;
> - Minimizing property and environmental resource impacts in neighboring communities;
> - Supporting the continued movement of non-truck traffic through downtown Vergennes; and
> - Providing a cost-effective use of resources."

The Purpose and Need Statement was first drafted by the project management team which includes the consultants, VTrans and ACRPC staff. It was later presented to and endorsed by the ACRPC Transportation Advisory Committee.

1.4 EVALUATION

The detailed evaluation of each alternative included an assessment of project costs and impacts. The most significant findings were as follows.

- Project implementation costs for Alternatives B and C are an order of magnitude higher than those for Alternative A. The estimates for Alternatives B and C are $39 million and $23 million, respectively. The total cost of improvements along VT 22A under Alternative A is $1.9 million and a portion of these costs may be covered by the pending paving project.
- Protection of environmental and historical resources and the mitigation of unavoidable impacts to these resources represents approximately $600,000 of the implementation cost of Alternative B and $100,000 of the implementation cost of Alternative C. The limited scope of work associated with Alternative A has only nominal mitigation costs.
- All three alternatives will have positive impacts on traffic safety. The Alternative A improvements will have a positive impact by lowering the crash rate on VT 22A in downtown Vergennes. Alternatives B and C will enhance safety by removing traffic from downtown Vergennes and by providing safer alternative routes.

- Alternative A will have relatively minor but positive quality of life and economic impacts on downtown Vergennes. By more safely accommodating pedestrian and bicycle traffic in the presence of the existing truck traffic it is assumed that downtown businesses will experience a slight increase in sales and property values.

- Alternatives B and C will have very positive quality of life and economic impacts on downtown Vergennes boosting retail sales, restaurant sales and property values by diverting 90 to 95 percent of the truck traffic that presently passes through the downtown. These impacts would be offset in part under Alternative C by increasing truck volumes past homes on VT 17 and lowering property values in this corridor.

- A significant negative consequence of Alternative C is the impact it would have on truck operations. The truck diversions proposed under this plan would add more than $2 million per year in travel costs for truckers. Alternatives A and B would have no significant impact on truck operating costs.

A summary of the Alternatives analysis is provided in Figure 1-4.

Figure 1-4 Evaluation Summary

Catergory		Alt. A - VT 22A Alternative	Alt. B - New Alignment Alternative	Alt. C - VT 17 Alternative
Project Implementation Costs				
	Construction	$ 1,900,000	$ 27,500,000	$ 17,500,000
	Design & Permitting	included in construction	$ 8,500,000	$ 5,390,000
	Land Acquistion	nominal	$ 2,150,000	$ 10,000
	Environmental Mitigation	$ -	$ 600,000	$ 100,000
	TOTAL (Lump Sum)	$ 1,900,000	$ 38,750,000	$ 23,000,000
	TOTAL (Annualized)*	$ 110,000	$ 2,700,000	$ 1,285,000
Project Impacts (Annualized)				
	Economic-Downtown**	$ 66,500	$ 237,500	$ 237,500
	Economic-Outside of Downtown***	$ -	$ 2,600,000	$ 8,500
	Safety (Crashes)	$ 52,000	$ 12,000	$ 37,000
	Truck Operations	$ -	$ (60,000)	$ (2,250,000)
	TOTAL	$ 118,500	$ 2,789,500	$ (1,967,000)
Feasibility				
	Probability of success	Very High	High	High
	Timing	2 to 5 years	10 to 15 years	8 to 12 years

* Lump Sum costs financed over 30 years at 2.75% interest.

** Net property tax, sales tax and meals tax revenues associated with increased downtown vitality.

*** Net property tax revenues associated with: 1) Changed property values along the New Alignment corridor associated with potential new development at full build out under Alternative B; and, 2) Changed property values along VT 22A and VT 17 due to truck traffic shifts associated with Alternative C.

The analysis of Alternative B was expanded to consider other potential economic impacts. The New Alignment Truck Route would pass through land that is presently undeveloped or in agricultural use. The new roadway in conjunction with possible zoning changes could stimulate new development along the roadway significantly increasing property values and associated property taxes. A "build out" scenario developed in conjunction with City leaders and the Vergennes Planning Commission indicates that at full build out, annual new property tax revenues of $2.6 million could be generated. This figure nearly matches the estimated annual cost to finance the $39-million roadway project.

1.5 RECOMMENDATIONS

In light of the above findings, the consultant team recommended implementation of improvements included under Alternative A as a short-term strategy to at least partially mitigate the ongoing impacts of truck traffic in Vergennes. These measures however, do not fully address the issue. Consequently, it was also recommended that Alternative B be pursued as the preferred long-term strategy to achieve the quality of life benefits expressed in the Purpose and Need Statement. Continued coordination with VTrans regarding the pending paving project is recommended to implement the short-term strategy. Seeking countywide endorsement of the long-term plan is recommended as a next step towards securing VTrans funding for project development and implementation.

2.0 INTRODUCTION

The Addison County Regional Planning Commission (ACRPC) in partnership with the Vermont Agency of Transportation (VTrans) retained Stantec Consulting Services, Inc. to evaluate the feasibility and preference for alternative truck routes to VT Route 22A through the City of Vergennes, Vermont. The project was managed by the ACRPC. A small working group of ACRPC and VTrans staff provided general direction and technical guidance. The ACRPC Transportation Advisory Committee (TAC), which has representatives from all towns in Addison County, provided feedback and direction to the consultant at major milestones. The study findings and recommendations were presented to all stakeholders at a public meeting and open house.

Three alternatives were identified for consideration in the study as follows.

VT 22A Truck Route. VT 22A would continue to serve as the primary truck route. Modifications would be made to VT 22A near and within Vergennes to mitigate the safety, traffic operations, noise and vibration impacts of large trucks.

New Alignment Truck Route. A road would be constructed on a new alignment that diverts through trucks from Vergennes (trucks without an origin or destination in Vergennes).

VT 17 Truck Route. Through trucks travelling on VT 22A would be diverted to VT 17 between VT 22A and US 7. VT 17, including major intersections, would be reconstructed as necessary to safely accommodate increased truck traffic.

The first phase of the study included three components. First, existing conditions data were collected to establish roadway, traffic, land use, environmental and economic conditions in the project study area. Second, the three alternatives were defined in sufficient detail to allow for a thorough and meaningful evaluation of each alternative. Third, a Purpose and Need Statement was developed that was used to measure the performance of each alternative. The existing conditions data, three alternatives and Purpose and Need Statement were first presented to the ACRPC TAC and then to all project stakeholders at a public meeting.

The next phase of the study included a detailed evaluation of each alternative. The proposed plans were reviewed to estimate project implementation costs. Environmental factors were considered to understand project feasibility and permitting issues. Upon concluding that all three alternatives were feasible, analyses were then conducted to understand project impacts and benefits related to the Purpose and Need Statement. Specifically, analyses were conducted to determine:

- Future traffic volumes for all vehicles and trucks on study area roadway segments;
- Impacts on roadway traffic operations;
- Impact of proposed changes in traffic volumes and proposed roadway improvements on vehicular crash experience and crash costs;
- Impact of truck route diversions on truck operating costs;
- Impact of truck traffic on land values for properties abutting impacted roadways;
- Impact on property tax revenues associated with anticipated changes in property values;
- Impact of truck traffic on retail and restaurant revenues in downtown Vergennes;
- Changes in tax revenues associated with changes in economic activity in downtown Vergennes;
- Potential new land development associated with the New Alignment Alternative; and
- Potential new tax revenues associated with new land development.

The findings from these investigations were documented in a draft report and shared first with the ACRPC TAC and then with all project stakeholders at a public meeting. This final report was then issued incorporating comments received on the draft report.

3.0 BACKGROUND

(This report section was drafted by the ACRPC and included in the Request For Proposals for this study.)

VT Route 22A is a minor arterial that serves as a major truck route from New York State to northern Vermont. Based on the most recent counts, there are up to 800 trucks per day on VT 22A as it passes through Main Street in the center of downtown Vergennes. Almost 60 percent of these trucks, 430 per day, are large tractor trailers that create significant noise, vibration, safety and traffic operational issues affecting the quality of life for Main Street businesses and homes and to the general travelling public. There have been two significant planning efforts over the last twenty years, summarized below, that evaluated alternate routes and other short-term options to mitigate the negative impacts of truck traffic. While some changes have been made to help calm traffic and improve the pedestrian environment, the volume of trucks passing through Vergennes has not abated and the negative impacts persist. A recent proposal by a former Vergennes mayor to divert northbound trucks to VT 17 was not well received by adjoining towns and the TAC but has served as motivation to reconsider all options.

The *Vergennes Route 22A Bypass Preliminary Design Report*[1] was completed by a consultant team in 1995 for the ACRPC. The study evaluated the feasibility of constructing an alternate truck route on a new roadway alignment in three general corridors including a far west option, near west option and an eastern option. The near west option was selected as the preferred corridor based on a qualitative assessment of traffic demand impacts, land use plans, natural features, infrastructure needs, and impacts to community character and scenic quality. A more detailed conceptual alignment was developed within the preferred "near west" corridor. The near west corridor evaluated in the Preliminary Design Report has one alignment from its northern intersection with VT 22A to MacDonough Drive. There were three alignment options considered from MacDonough Drive, across the Otter Creek and Panton Road to the southern intersection with VT 22A in Panton. Both the southern and northern intersections with VT 22A were assumed to be roundabouts. The Preliminary Design Report also presents different roadway design alternatives including a typical two-lane rural highway designed for 55 mph with wide travel lanes and shoulders and a 100-foot wide ROW; a modified roadway standard with shoulders for on-road biking and vegetation closer to the roadway; and a city parkway concept. The Preliminary Design Report also presented several scenarios demonstrating how these design options would support different land use development patterns. The Preliminary Design Report compared the pros and cons of the different alignment, roadway design and land use pattern options but did not recommend a specific alignment or design.

The bypass concept was supported by the City of Vergennes, but the surrounding towns had concerns. The 2002 *Greater Vergennes Traffic Impact Feasibility Study*[2] was undertaken by the

[1] Community Planning & Design with Buckhurst Fish & Jacquemart Inc, Kathleen Ryan, Landscape Architect, and Pinkham Engineering Associates, Inc. November 1995. *Vergennes Route 22A Bypass Preliminary Design Report*.
[2] Dufresne-Henry. July 2002. *Greater Vergennes Traffic Impact Feasibility Study*.

ACRPC with consultant assistance to build consensus on the issues creating the need for an alternate truck route and to identify feasible short and longer-term solutions. The Study's recommendations were based on a series of workshops in Vergennes, Panton and Ferrisburgh with the public and others with expertise and knowledge of the issues. Based on the workshops, the Study presents a Purpose and Need statement that clearly articulates a desire to "…address and mitigate the negative impacts, existing and anticipated, relating to the heavy truck traffic travelling through the City of Vergennes and to facilitate freight travel along the Route 22A corridor with a minimum of restrictions and hindrances." It documents a variety of concerns and provides comments on the following solution areas: Bypass around Vergennes, Alternative Routes, Alternative Transportation Systems and Downtown Improvements. The Study recommends some short-term actions and concludes that the long-term approach should be to find an alternative route to VT 22A through Vergennes for trucks and recommends further consideration of the bypass. The Study also recommends that VT 17, which connects VT 22A to US 7 south of Vergennes, should also be evaluated as an alternate route since costs are comparable to the bypass but no new roadway alignment would be required.

It has been more than twenty years since the 1995 Preliminary Design Report was completed and more than 15 years since the 2002 Greater Vergennes Traffic Impact Feasibility Study was completed. While the City of Vergennes has made progress improving the streetscape and pedestrian environment along VT 22A in its downtown, the volume of large trucks and associated impacts persist.

4.0 EXISTING CONDITIONS

Exiting conditions for the study area were established creating a baseline for the evaluation of alternative actions. The study area includes portions of VT 22A, VT 17 and US 7 connecting Addison, Ferrisburgh and New Haven. Also included is the new alignment corridor passing to the west and north of downtown Vergennes. Traffic volume, traffic operations, vehicle crash, and transit system data for the entire study area are first presented. Roadway conditions, land use data, environmental and cultural resource data are then presented for five separate subareas. The five subareas are identified in Figure 4-1. The three primary subareas include downtown Vergennes, the new alignment corridor, and the VT 17 corridor as these will be directly and significantly impacted by at least one of the three actions under consideration. Two other subareas are documented including VT 22A outside of the downtown area and a section of the US 7 corridor. These secondary subareas are relevant in terms of understanding the regional impacts of the alternatives under consideration. The VT 22A subarea data is also needed to develop conceptual plans for connections to VT 22A for the new alignment alternative.

Figure 4-1 Project Subareas

4.1 SUMMARY

The analysis of existing conditions was conducted primarily to establish baseline conditions for the evaluation of alternatives. The details of the existing conditions analysis are described below. Key findings from this analysis are listed here.

- **Traffic Volumes:**
  - VT 22A is one of the heaviest traveled roadways in the study area carrying up to 9800 vehicles per day in downtown Vergennes compared to only 7400 vehicles per day on US 7 in New Haven.
  - Commuter peak period traffic counts indicate that traffic volume levels are considerably higher during the PM peak hour compared to the AM peak hour.
  - Peak hour volumes on Main Street in downtown Vergennes are nearly balanced by direction. Northbound and southbound volumes are nearly equal during the PM peak hour.

- **Trucks:**
  - VT 22A carries an unusually high volume of trucks. Up to 800 trucks per day, including more than 500 tractor trailer units, pass through downtown Vergennes. In comparison, US 7 in Brandon carries only 190 large trucks per day, US 4 in Woodstock carries 140 large trucks per day and VT 116 in Bristol carries 50 large trucks per day.
  - The truck volume is high compared to other roadways in the study area with only 268 large trucks per day on US 7 in New Haven and 71 large trucks per day on VT 17 in Waltham.
  - Volumes for large trucks (tractor trailer units) peak during the morning hours yet during the lunch hour one tractor trailer unit passes through the downtown every four minutes on average. One large truck passes through the downtown every three minutes on average during the dinner hour.
  - A vehicle tracking survey indicates that 90 percent of smaller trucks and 98 percent of tractor trailer trucks on VT 22A are through trucks not stopping in Vergennes.
- **Traffic Operations:**
  - Intersections in the study area generally operate free of congestion even during commuter peak hours. The one exception identified relates to traffic entering VT 22A from Panton Road during the PM peak hour when employees are exiting the Collins Aerospace facility.
- **Traffic Safety:**
  - Crash rates on study area roadways are generally within normal ranges with one exception. Main Street in downtown Vergennes is classified by VTrans as a High Crash Location. This may be attributable to the high number of closely spaced intersections in the downtown area.
  - Comparing roadway segments outside of downtown Vergennes, VT 17 has the highest crash rate at 1.27 crashes per million vehicle miles of travel.
  - Over a five-year span studied, no crashes involving pedestrians or bicyclists were reported in the study area in the VTrans database.
- **Roadway Conditions:**
  - Roadway cross sections (the combined width of travel lanes and shoulders) along two roadway segments in the study area do not comply with VTrans standards for roadways carrying heavy truck traffic volumes. These segments include all of VT 17 between VT 22A and US 7 and VT 22A through Vergennes.

- Roadway grades greatly exceed VTrans standards (actual 11%, recommended maximum six percent) on Main Street in downtown Vergennes just north of Otter Creek.
- Accommodations for pedestrians (sidewalks) and bicyclists (bike lanes) are not provided outside of Vergennes.

- **Transit:**
  - Downtown Vergennes is accessible via public transportation with bus service to Middlebury and Burlington.
- **Natural and Cultural Resources:-**
  - Natural and cultural resources found in the study area are typical for Vermont. The most significant natural resources relate to the Otter Creek and its associated wetlands and floodplain.

4.2 ENTIRE STUDY AREA

Certain existing conditions data were collected and examined over the entire project study area. The data relate principally to vehicular traffic volumes, vehicle crashes, traffic operations, and transit services.

4.2.1 Traffic Volumes

Traffic volume data collected for the study area includes daily traffic volumes on roadway links and peak hour volumes for intersections. Generally, vehicle classification counts were examined such that truck volumes could be evaluated separate from other traffic. Also, field surveys were conducted to estimate the volume on through trucks passing through downtown Vergennes.

4.2.1.1 Daily Traffic Volumes

Vehicular traffic volumes for the study area roadways were collected from the VTrans traffic volume database and other recent studies. The source data includes automatic traffic recorder counts and vehicle classification counts on roadway segments and vehicle turning movement counts at intersections. The source data are provided in the report appendix. Figure 4-2 shows the existing daily traffic volumes on the study area roadways. (The daily volumes are based on 2017 traffic counts at most locations.) As shown, the highest volume roadway segment in the study area is US 7 north of VT 22A which carries 12,900 vehicles per day. South of the VT 22A/US 7 intersection this volume splits with approximately 7200 vehicles per day using VT 22A and 7400 vehicles per day on US 7. VT 17 carries a relatively modest volume of only 1800 vehicles per day east of VT 22A. West of VT 22A it carries 3100 vehicles per day. 2017 daily volumes for large (tractor trailer) trucks, are provided in Figure 4-3. Truck traffic volumes are also heaviest on US 7 north of Vergennes. There are approximately 725 large trucks per day on US 7 north of VT 22A.

South of the VT 22A/US 7 intersection VT 22A carries 510 large trucks per day and US 7 carries approximately 270 large trucks per day. VT 17 east of VT 22A carries only 71 large trucks per day.

Figure 4-2 Daily Traffic Volumes

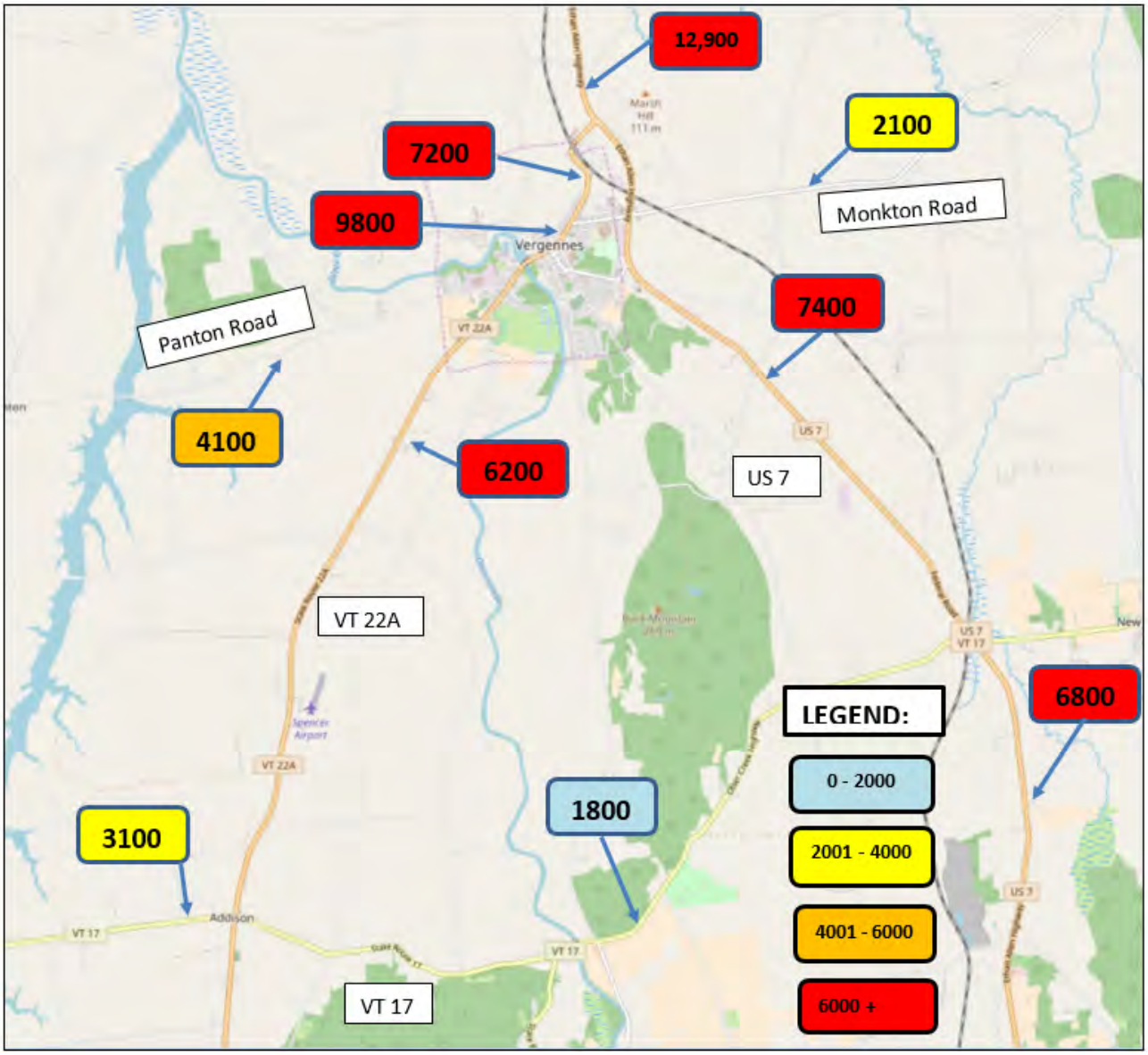
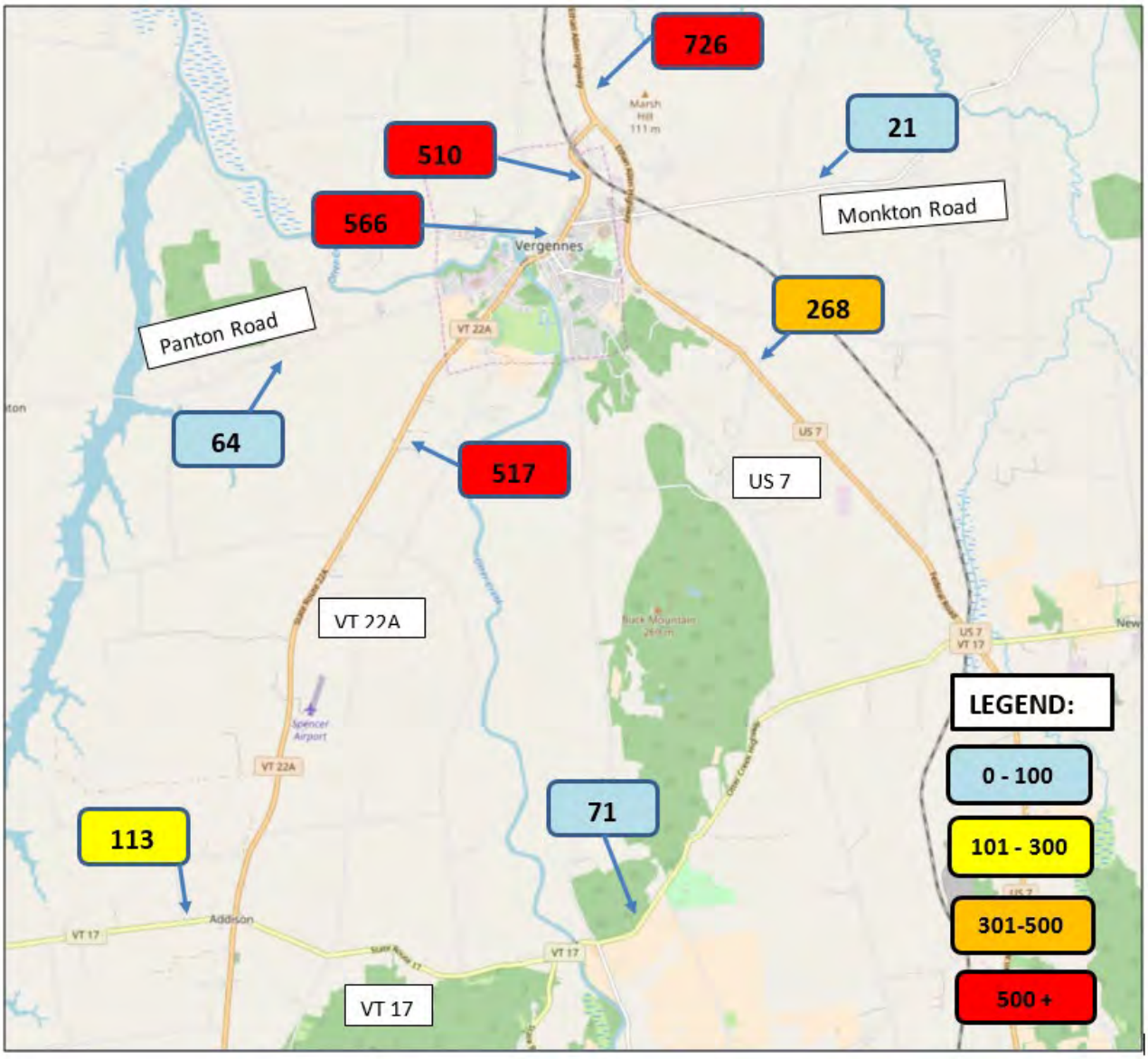


Figure 4-3 Daily Large Truck (Tractor Trailer) Volumes

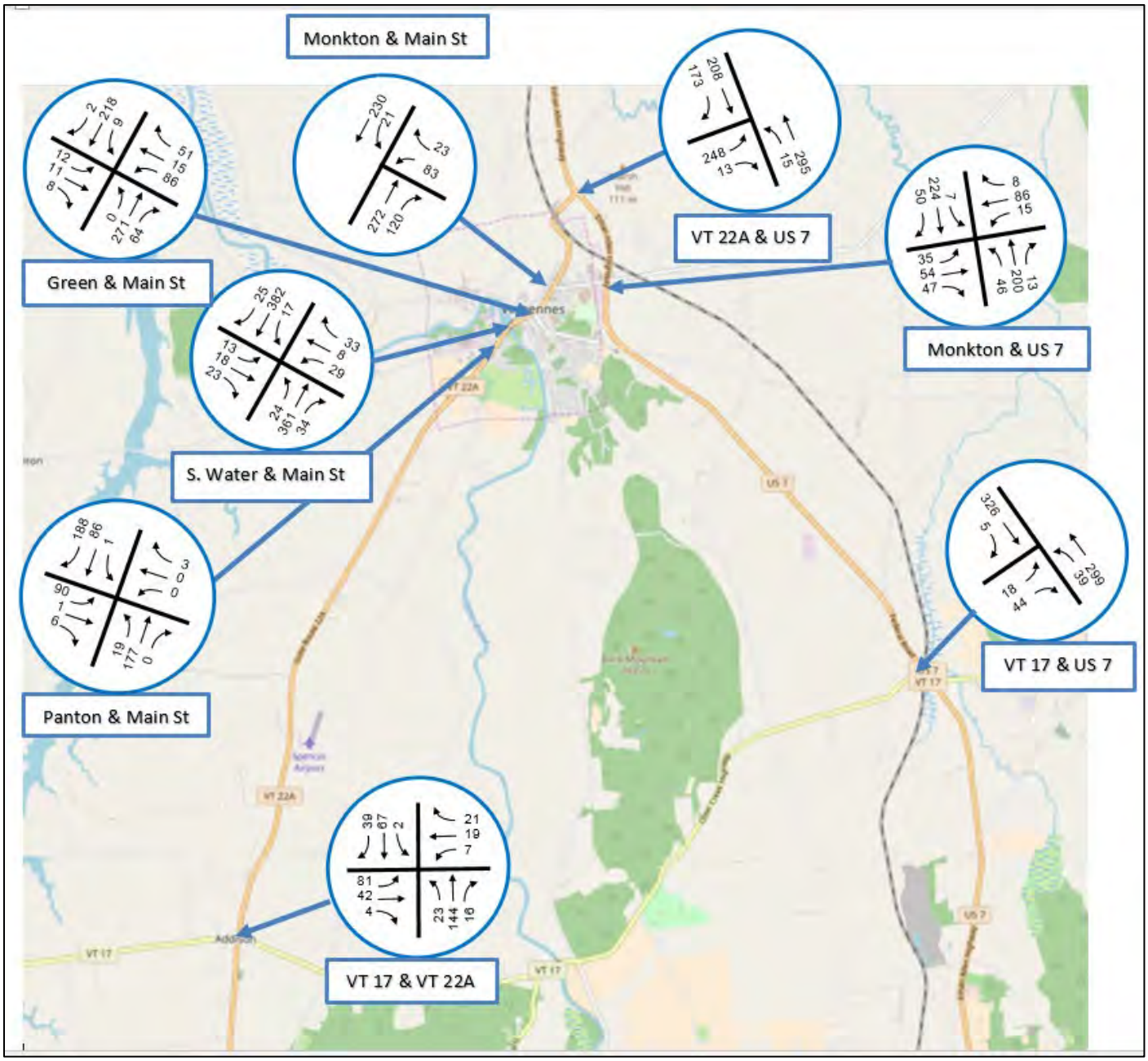


4.2.1.2 Vehicle Turning Movement Counts

Vehicle turning movement counts were also compiled for commuter peak hour conditions for each of the major intersections in the traffic study area. These volumes are reported in Figures 4-4 and 4-5 for the AM and PM peak commuter hours, respectively. The counts were generally collected within the last five years. The data indicate 565 vehicles on Main Street just north of Green Street during the AM peak hour and 905 vehicles at this location during the PM peak hour. Further south on VT 22A just north of VT 17, VT 22A carries 355 AM peak hour vehicles and 465 PM peak hour vehicles. The higher volumes reported in PM peak hour indicate that the PM

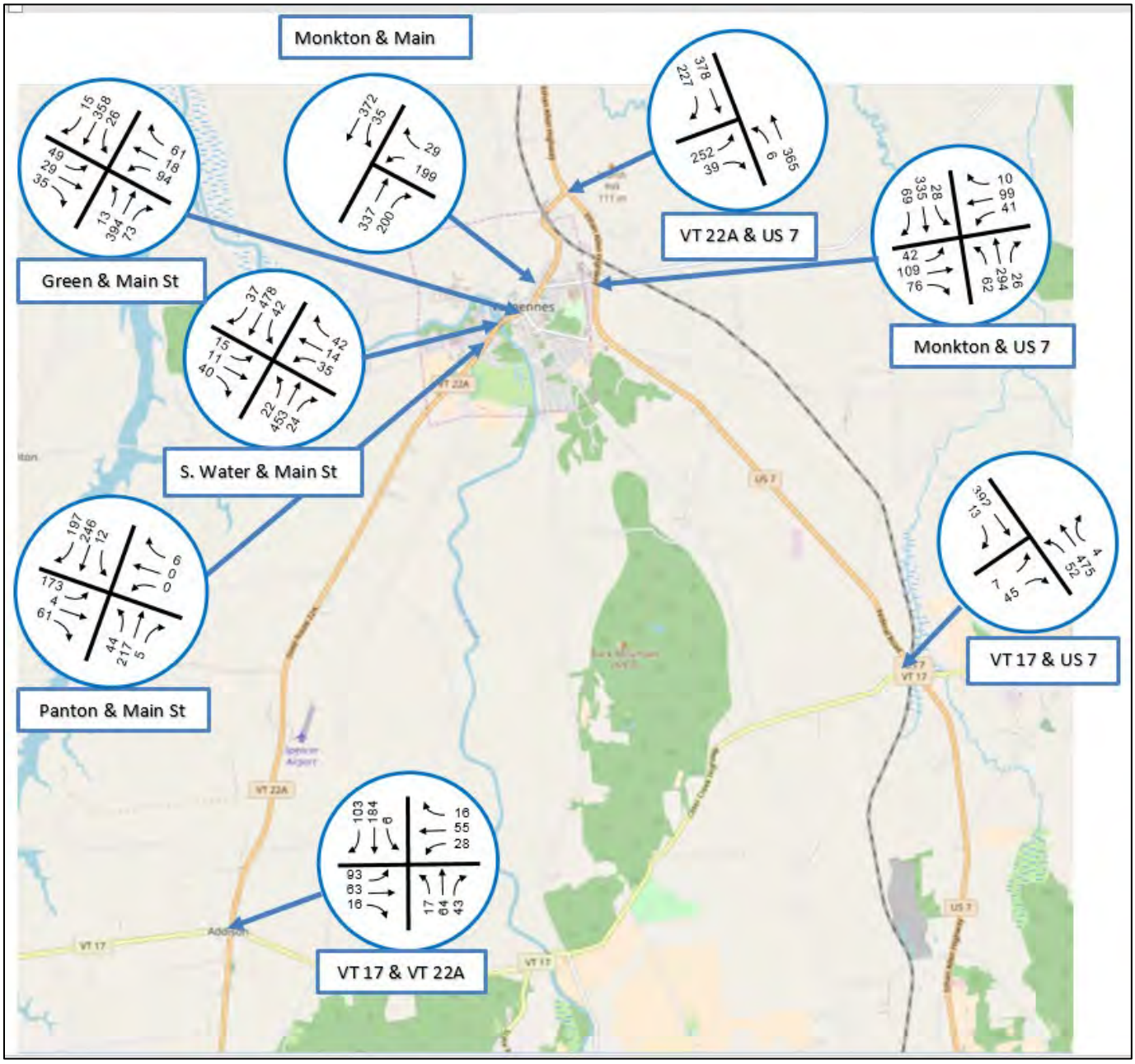
peak hour is more critical from a traffic operations perspective. Consequently, operations analyses in this study address the PM peak hour condition.

Figure 4-4 Existing AM Peak Hour Traffic Volumes



Note: Peak hours vary by location. Peak hours reported for the 7 AM to 9 AM time period.

Figure 4-5 Existing PM Peak Hour Traffic Volumes

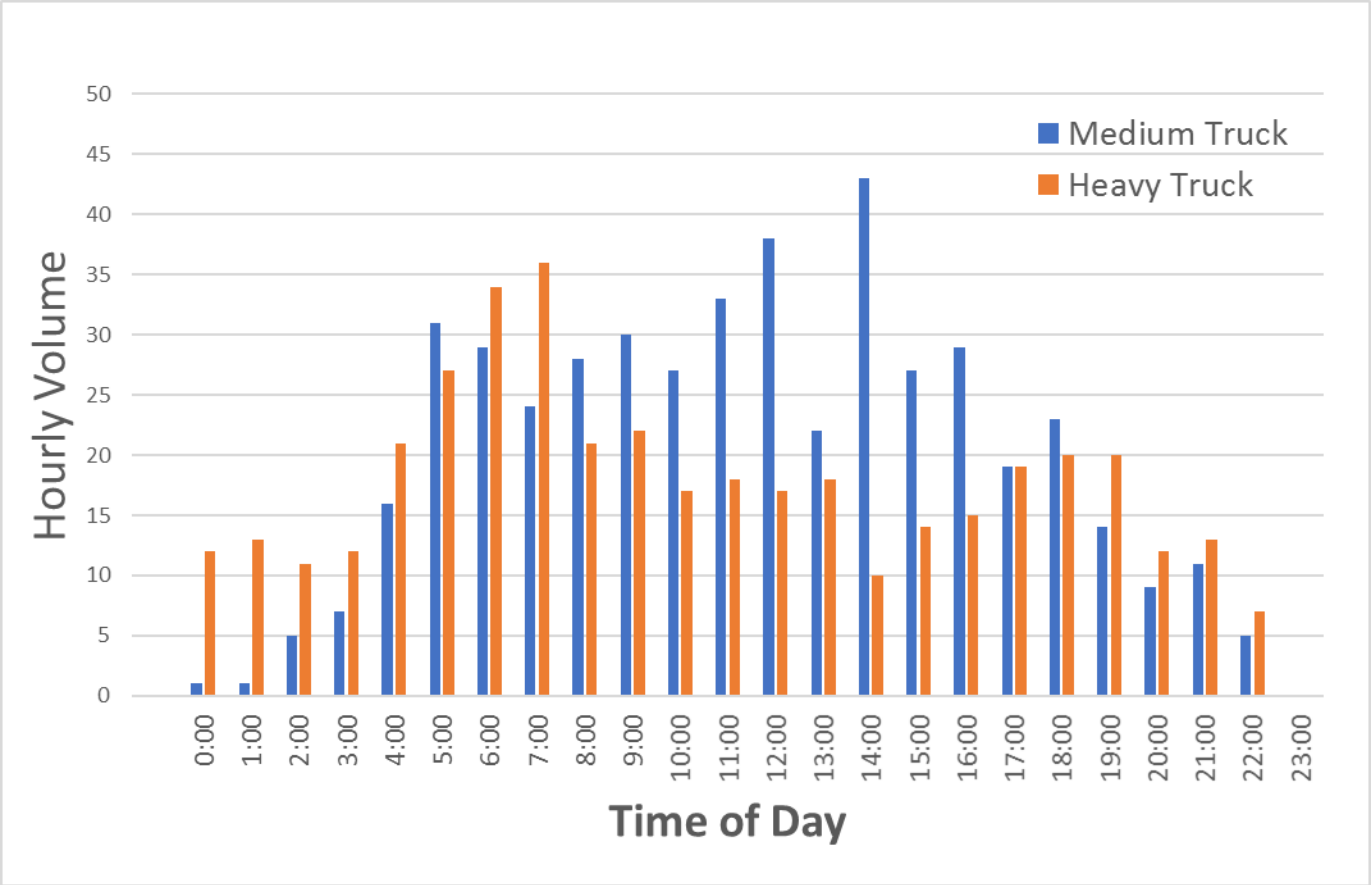


Note: Peak hours vary by location. Peak hours reported for the 4 PM to 6 PM time period.

The most recent volumes reported for VT 22A are provided in a vehicle classification count conducted in August 2018 by VTrans 1.2 miles north of VT 17. This count, summarized in Figure 4-6, shows the hourly variation in volumes for heavy trucks and medium trucks. (The terms "heavy" and "large" trucks are used interchangeably throughout this study to reference 18-wheel, tractor trailer units. Smaller trucks, other than pick-up trucks, are referenced as either "small" or "medium" trucks.) As shown, the busiest hours for heavy truck traffic along VT 22A occur from 6

to 8 AM. During this period more than 30 large trucks per hour pass through Vergennes or approximately one truck every two minutes. However, large truck traffic persists through all hours of the day with only one hour experiencing fewer than ten trucks per hour. During lunchtime when diners may be patronizing sidewalk cafes, one larger truck passes every four minutes. During the dinner hours one large truck passes every three minutes. Activity for smaller trucks peaks during the afternoon with over 40 smaller trucks recorded in the 2 to 3 PM hour.

Figure 4-6 Hourly Truck Volumes on VT 22A



Note: Data collected by VTrans August 31, 2018 at Location ID A111 on VT 22A in Addison 1.2 miles north of VT 17.

4.2.1.3 Through Truck Traffic

A license plate matching survey was conducted by VTrans staff in July 2018 to determine the volume of trucks on VT 22A that are through trucks passing through Vergennes without stopping. The surveys were conducted from 12 PM to 6 PM on separate dates for each direction of travel. On Thursday, July 19, 2018 northbound trucks were recorded at three locations: on VT 22A just north of VT 17 (approaching Vergennes); on VT 22A at US 7 (leaving Vergennes); and, on Monkton Road at US 7 (leaving Vergennes). Southbound truck movements were recorded on Tuesday, July 31, 2018 at the same locations. The collected vehicle identification data were

sorted and compared to look for matches between trucks entering Vergennes and trucks exiting Vergennes. Any truck reported leaving the survey area within 20 minutes of entering the survey area was identified as a through truck that presumably passed through Downtown Vergennes without stopping. As shown in Table 4-1, 131 northbound truck movements were recorded and 90 percent of these were through trucks. Large trucks, tractor trailer units, are even more likely to be through trucks. Approximately 97 percent of the large northbound trucks were identified as through trucks. Similar results were reported for southbound travel. Consequently, approximately 90 percent of the trucks recorded on VT 22A south of Vergennes pass through Downtown Vergennes without stopping. Similarly, approximately 98 percent of the large trucks recorded at this location also pass through Vergennes without stopping.

Table 4-1 Truck License Plate Matching Survey Results

	All Trucks			Large Trucks		
Direction	Total	Through Trucks		Total	Through Trucks	
Northbound	131	118	90%	94	91	97%
Southbound	130	115	88%	95	93	98%

Note: Survey data collected by VTrans on July 19, 2018 and July 31, 2018.

4.2.2 Traffic Operations

Traffic operations along roadways and at intersections can be quantified and reported in terms of operating level of service. Operating levels of service vary by time of day in conjunction with hourly variations in travel demand. Typically, peak hour traffic demands are examined to determine "worst case" operating conditions. As noted above, evening commuter travel demands are higher than morning peak hour travel demands. Consequently, the PM peak hour intersection operating levels of service were determined in this study.

Level of service (LOS) is a term used to describe the quality of the traffic flow on a roadway facility at a particular point in time. It is an aggregate measure of travel delay, travel speed, congestion, driver discomfort, convenience, and safety based on a comparison of roadway system capacity to roadway system travel demand. Operating levels of service are reported on a scale of A to F, with A representing the best operating conditions with little or no delay to motorists, and F representing the worst operating conditions with long delays and traffic demands sometimes exceeding roadway capacity.

Intersection operating levels of service are calculated following procedures defined in the *Highway Capacity Manual*, published by the Transportation Research Board. For signalized intersections the operating level of service is based on travel delays. Delays can be measured in the field but generally are calculated as a function of traffic volume; peaking characteristic of traffic flow; percentage of heavy vehicles in the traffic stream; type of traffic control; number of travel lanes and lane use; intersection approach grades; and, pedestrian activity. Through this analysis volume-to-capacity ratios can be calculated for individual movements or for the intersection as a whole. A volume-to-capacity ratio of 1.0 indicates that a movement or

intersection is operating at its theoretical capacity. The specific delay criteria applied per the *2010 Highway Capacity Manual* to determine operating levels of service are summarized in Table 4-2.

Table 4-2 Intersection Level of Service Criteria

	Average Delay per Vehicle (Seconds)	
Level of Service	Signalized Intersections	Unsignalized Intersections
A	≤10.0	≤10.0
B	10.1 to 20.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0
D	35.1 to 55.0	25.1 to 35.0
E	55.1 to 80.0	35.1 to 50.0
F[1]	>80.0	>50.0

[1]Level of Service F is also assigned to movements if the volume-to-capacity ratio exceeds 1.0.

Source: *HCM 2010 Highway Capacity Manual*, Transportation Research Board, National Academy of Sciences, Washington, DC, 2010.

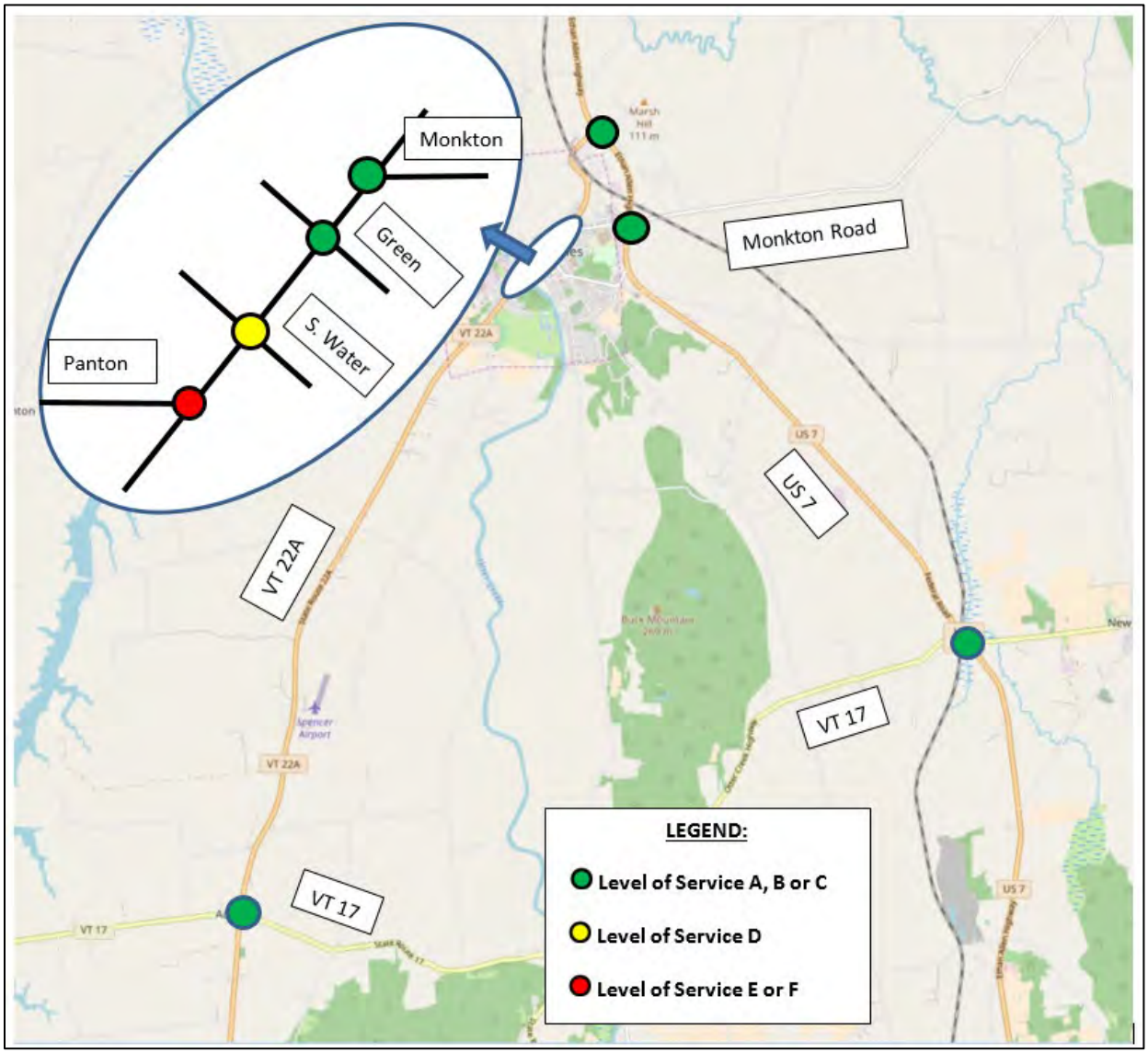
Capacity analysis results for the major intersections in the study area under existing PM peak hour conditions are presented in Table 4-3 and in Figure 4-7. For the signalized intersections the overall level of service, volume-to-capacity ratio and average delay are reported. Worksheets provided in the appendix indicated operating conditions on individual intersection approaches. For the unsignalized locations, operating conditions on the stop-controlled side street approaches are reported. As shown, the signalized intersections in the study area operate at LOS C or better. The unsignalized Panton Road intersection approach to VT 22A has the worst operating level of service in the study area, LOS E during the PM peak hour. This approach, however, operates well below capacity at 71 percent of capacity.

Table 4-3 Existing PM Peak Hour Intersection Level of Service

Intersection	LOS[1]	Delay[2]	V/C[3]
Signalized Locations:			
US 7/VT 22A			
Overall	B	10	0.49
***Monkton* Road/Main Street**			
Overall	B	18	0.53
Green Street/Main Street			
Overall	B	16	0.74
***Monkton* Road/US 7**			
Overall	C	23	0.55
Unsignalized Locations			
S. Water St./MacDonough Dr./Main St.			
Eastbound (MacDonough)	C	24	0.27
Westbound (S. Water)	D	29	0.37
Panton Road/VT 22A			
Eastbound (Panton Road)	E	36	0.71
Westbound (Elm Street)	A	10	0.01
VT 17/VT 22A			
Eastbound (VT 17)	C	18	0.41
Westbound (VT 17)	B	15	0.24
VT 17/US 7			
Eastbound (VT 17)	B	13	0.11

[1] LOS= Level of Service
[2] Delay = Average delay expressed in seconds per vehicle
[3] V/C = Volume-to-capacity ratio

Figure 4-7 Intersection PM Peak Hour Operating Levels of Service



4.2.3 Crash History

Vehicle crash data for the study area is reported in Figure 4-8. This figure locates crashes listed in the VTrans Crash Database for a five-year period, 2013-2017. Figure 4-9 locates crashes involving trucks. Crash counts on roadway segments were compared to the traffic volumes on those segments to calculate crash rates. These crash rates are reported in Table 4-4. As shown, 57 crashes occurred on Main Street in the downtown Vergennes subarea and this subarea has the highest crash rate. This is due to the multiple closely-spaced intersections along this segment and the conflicts associated with turning and crossing traffic streams at these intersections. No crashes involving pedestrians or bicyclists were reported in the study area in the VTrans database.

Figure 4-8 All Vehicle Crashes (2013-2017)

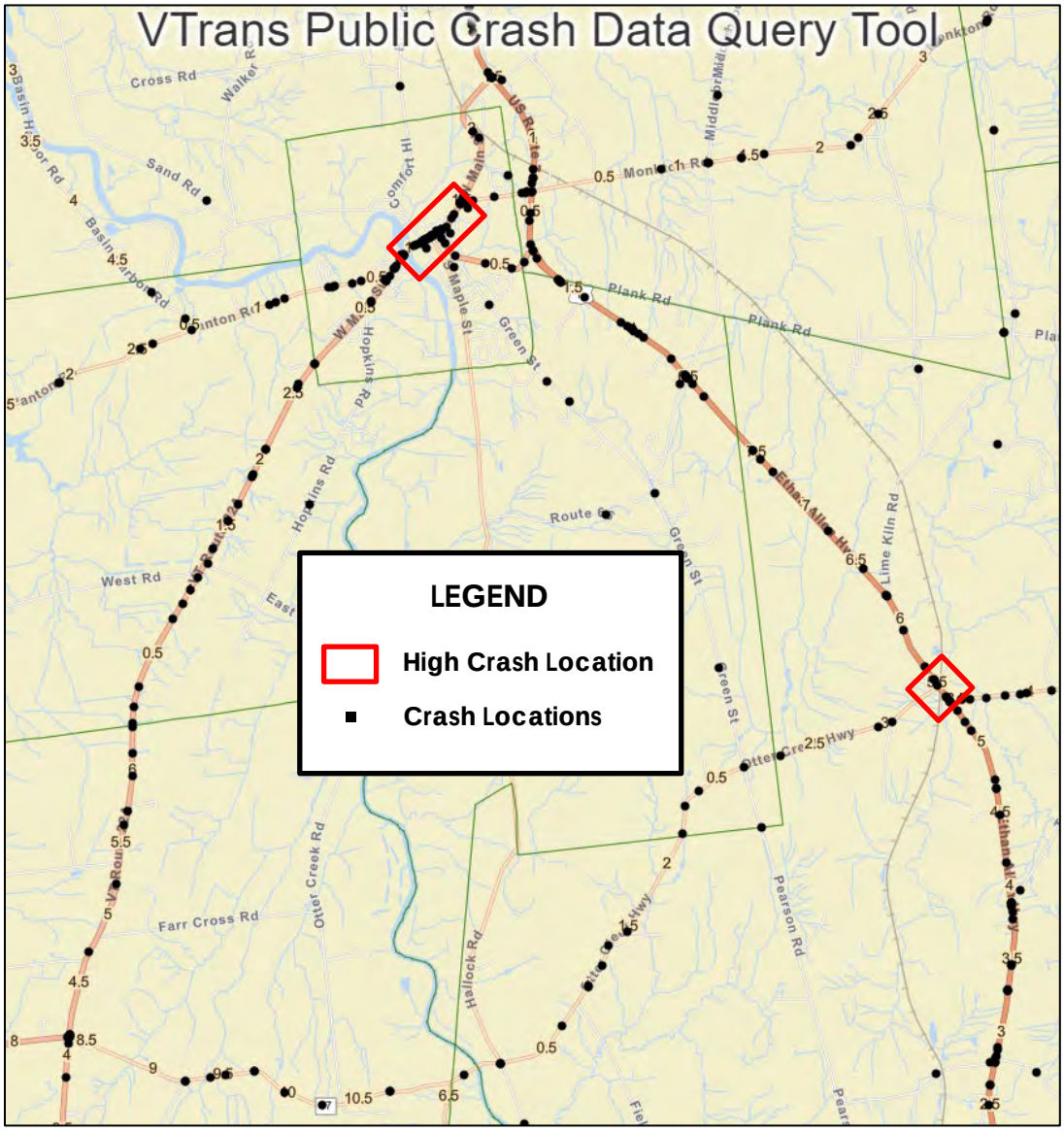


Figure 4-9 Crashes Involving Trucks (All Types) (2013-2017)

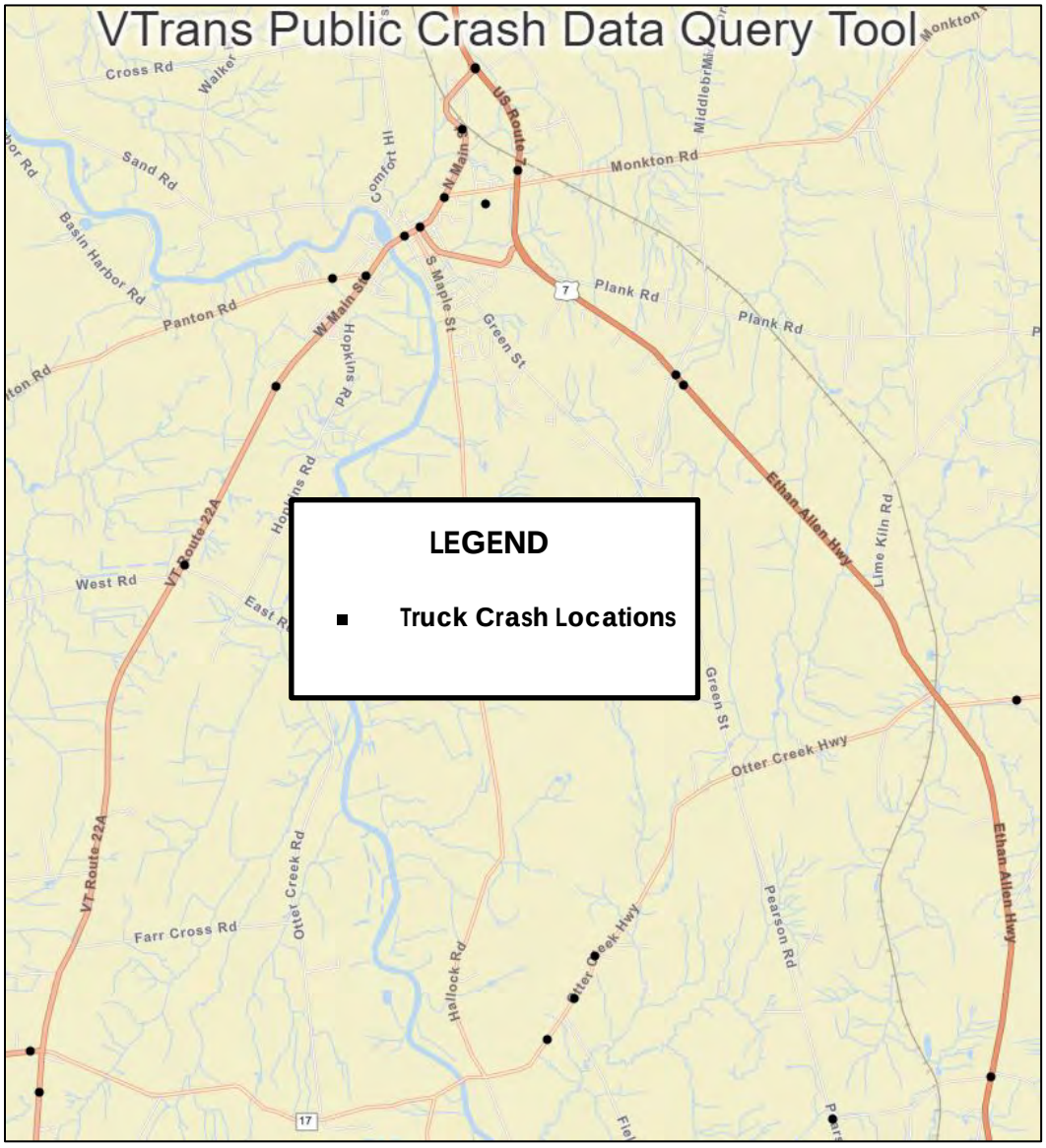


Table 4-4 Crashes and Crash Rates by Subarea

Subarea	Length (miles)	2017 AADT	Crashes (2013 - 2017)	Crash Rate[1]	Crashes Involving Trucks[2]	Crashes Involving Pedestrians or Bicyclists
Downtown Vergennes (Main St)	0.5	9800	57	6.37	2	0
VT 17	7.4	1700	29	1.27	3	0
VT 22A South of Downtown	5.9	5700	51	0.93	1	0
VT 22A North of Downtown	1.0	7200	6	0.46	1	0
US 7	5.4	7550	62	0.86	4	0

[1]Crashes per million vehicle miles traveled.
[2]All types of trucks

As noted in Figure 4-8, the downtown Vergennes subarea contains a roadway segment classified by VTrans as a High Crash Location (HCL). Another HCL segment is located along US 7 at VT 17. A highway segment or intersection must have at least five crashes over a five-year period and the actual crash rate must exceed a critical crash rate calculated for that type of roadway facility based on statewide data to qualify as an HCL. The HCL's shown are based on data for 2012 through 2016. The HCL in downtown Vergennes includes three overlapping 0.3-mile roadway segments. The crash severity indexes for these three segments range from $13,000 to $36,000. The severity index indicates the average cost per crash with property damage only crashes valued at $11,300 per crash, injury crashes valued at $88,500 per crash, and fatal crashes valued at $1,500,000 per crash. Two of the crashes in the downtown Vergennes subarea involved trucks.

The US 7 HCL is limited to a 0.3-mile roadway segment where VT 17 crosses US 7. Twelve crashes occurred on this segment over the five-year study period. The approximate average crash severity is $38,000. The crash locator tool indicated that only one crash for the 2013 to 2017 study period occurred within the VT 17 West/ US 7 intersection.

4.2.4 Transit

Vergennes and the study area are served by two bus routes operated by two different transit service providers. Green Mountain Transit (GMT) operates a regional route connecting Burlington and Middlebury principally via US Route 7 with stops in Vergennes and Ferrisburgh. The Ferrisburgh stop is at the Park and Ride lot on VT 22A just south of its intersection with US 7. Southbound buses also stop at the Opera House on Main Street in Vergennes. The northbound stop is at Main Street on Green Street. Green Mountain Transit provides weekday service with two round trips made during the morning commuter period and two round trips made during evening commuter period.

Addison County Transportation Resources (ACTR) operates the above GMT route on Saturdays with three round trips provided: one in the morning; one at midday; and, one in the late

afternoon. ACTR also operates the Tri-Town Shuttle service connecting Vergennes, Bristol and Middlebury. The Vergennes link connects Downtown Vergennes with the New Haven Park and Ride lot on North Street. This route uses US 7 and VT 17 east of US 7. On morning runs buses enter downtown Vergennes by way of New Haven Road and Green Street and then return by way of Monkton Road. In the afternoon the buses make the loop in the opposite direction. One morning trip and one evening trip also extends out and back from downtown Vergennes to the Collins Aerospace facility on Panton Road. Other trips can be extended upon request. There are four round trips made between Middlebury and Vergennes in the morning and five round trips made in the evening.

4.2.5 Natural and Cultural Resources

A desktop review was completed to identify known wetlands, streams, Rare, Threatened or Endangered (RTE) species, agricultural land, 4(f) and 6(f) public lands, and hazardous waste sites in the study area. The Vermont Agency of Natural Resources (ANR) Natural Resources Atlas mapping program[3] was used to evaluate known natural resources within the three primary subareas. The Addison County Regional Planning Commission GIS data was used to identify archeological overlay areas and buildings on the National Registry of Historic Places[4]. Findings are presented in the discussions of individual subareas below.

4.3 DOWNTOWN VERGENNES SUBAREA

The downtown Vergennes subarea would be directly and significantly impacted by each of the alternative actions under consideration. This area includes VT 22A (Main Street) and adjacent land uses through downtown Vergennes between Otter Creek to the south and Monkton Road to the north. (Main Street has a southwest/northeast orientation in downtown Vergennes however, VT 22A generally has a south/north orientation from a regional perspective. Consequently, a south/north orientation for Main Street is used in this report.) This area would be physically altered under Alternative A and experience significant changes in through truck traffic volumes under Alternatives B and C.

4.3.1 Roadway Conditions

Roadway conditions in this subarea are described below as they define opportunities and constraints relative to potential mobility enhancement strategies. Main Street in downtown Vergennes is classified as a Minor Arterial. It is considered a primary bike route under the state's Master Bicycle Plan[5].

It is a two-lane roadway with a posted speed limit of 25 miles per hour (mph). The roadway right of way is approximately 66 feet wide. The roadway cross section varies by location with on-street parking conditions varying throughout this segment.

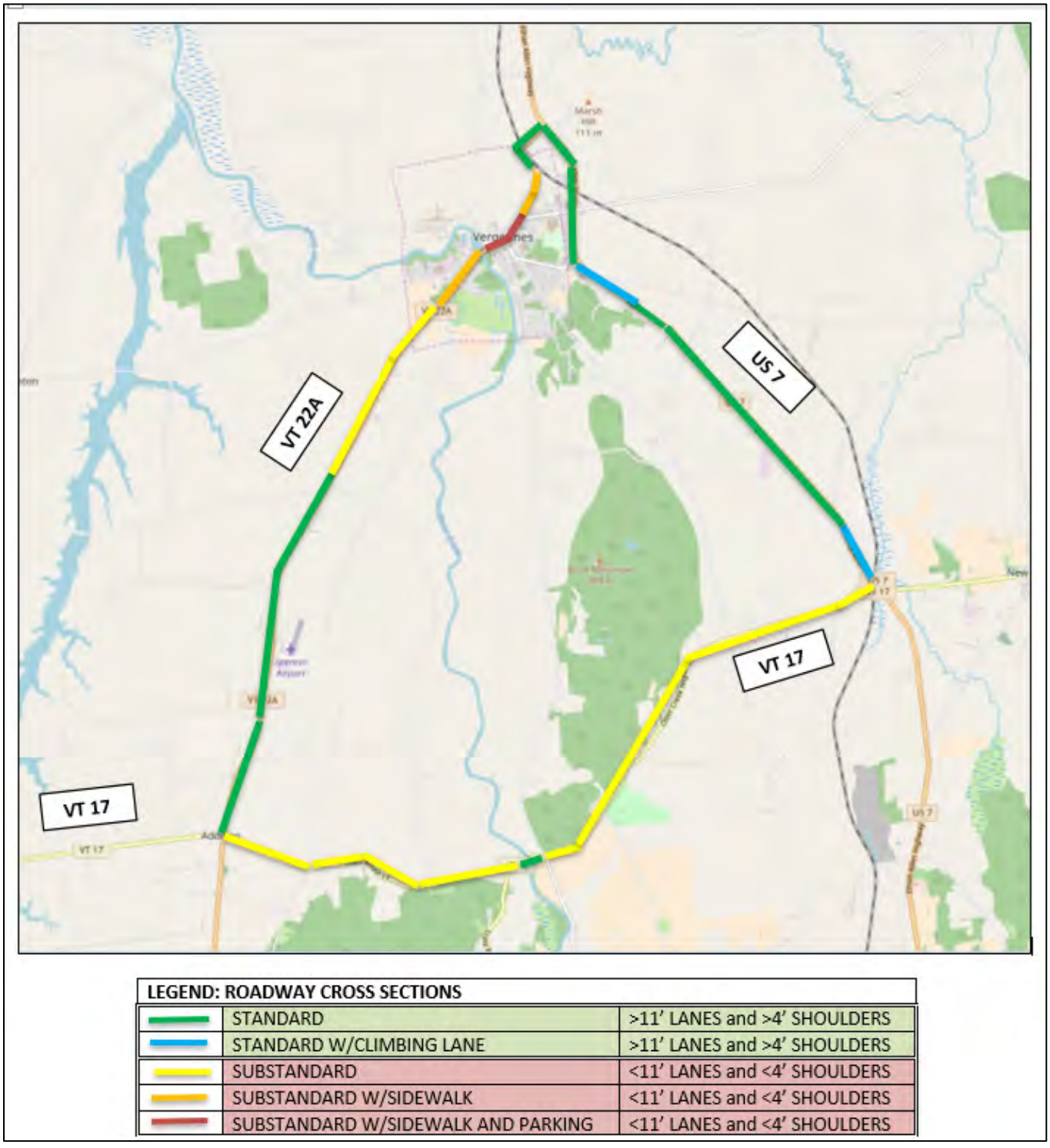
[3] http://anrmaps.vermont.gov/websites/anra/
[4] http://geodata.vermont.gov/datasets/a6041c19b39d4357b30dc13f9a5fe2bc_0
[5] RSG Inc. April 2016. *VTRANS on Road Bicycle Plan: Phase 1 Report*.

Figure 4-10 summarizes roadway cross sections throughout the study area. Color coding is used to designate roadway segments that provide a standard cross section (minimum 11 feet wide lanes and minimum four feet wide shoulders) suitable for heavy truck traffic. As noted, within the downtown subarea, these design criteria are not met. Rather, the roadway cross section is more consistent with its urban setting and the need to accommodate multiple travel modes. Lane widths meet state standards however, shoulders are either too narrow, non-existent or used for parking. Within the right of way, on-street parking and sidewalks are provided to meet the needs of the downtown area. From just north of MacDonough Drive to East Street, parallel parking is allowed on the west (southbound) side of the road and head-in, angle parking is allowed on the east (northbound) side. Sidewalks are provided on both sides of the road in this area. Building facades are located within 30 feet of the edge of the traveled way. Outdoor dining occurs within this 30-feet band at several restaurants. North of this core area, parallel parking is allowed on both sides of VT 22A from East Street to School Street and on the west (southbound) side to Monkton Road. South of MacDonough Drive there is only a sidewalk on the east side of the roadway. There are no designated bicycle accommodations (bike lanes or sharrow markings) in the downtown Vergennes subarea.

The horizontal roadway alignment in the downtown Vergennes subarea is generally tangent. There is an angle point at the Main Street intersection with East Street and a slight curve to the bridge over the Otter Creek. The roadway profile shown in Figure 4-11 indicates a northbound upgrade of more than 11 percent for 500 feet between Otter Creek and MacDonough Drive and continuing at an approximately ten percent grade another 400 feet to Maple Street. The upgrade continues at three percent from Maple Street to East Street.

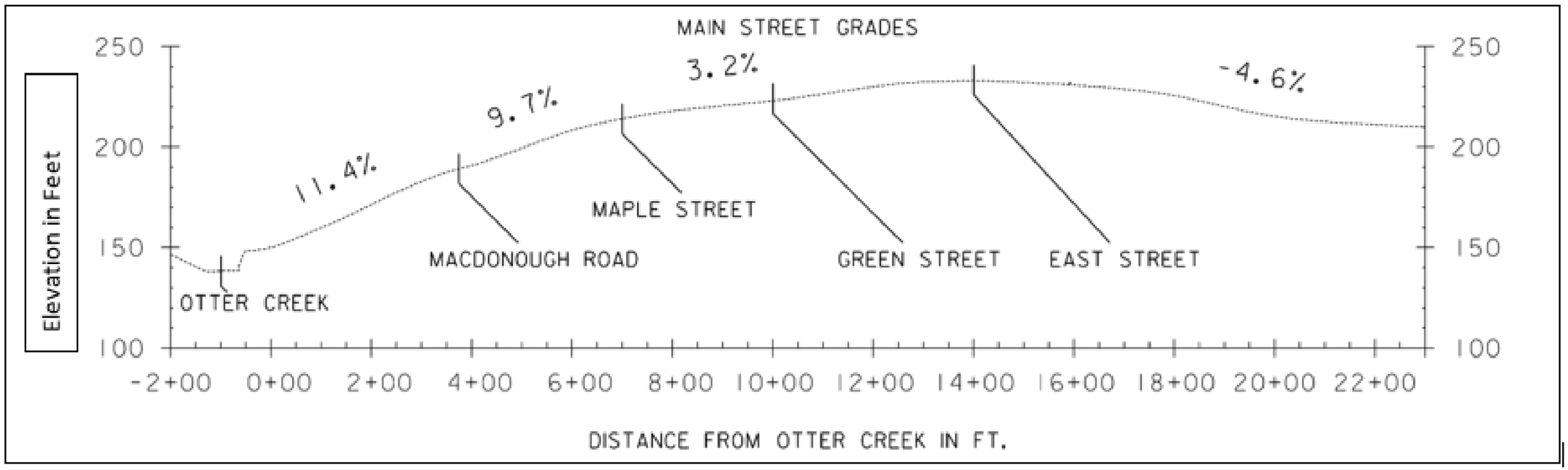
Within this subarea there are five intersections along Main Street. Numerous private driveways enter Main Street outside of the core area. Roadway and traffic control conditions at the five major intersections are described below.

Figure 4-10 Roadway Cross Sections



LEGEND: ROADWAY CROSS SECTIONS		
	STANDARD	>11' LANES and >4' SHOULDERS
	STANDARD W/CLIMBING LANE	>11' LANES and >4' SHOULDERS
	SUBSTANDARD	<11' LANES and <4' SHOULDERS
	SUBSTANDARD W/SIDEWALK	<11' LANES and <4' SHOULDERS
	SUBSTANDARD W/SIDEWALK AND PARKING	<11' LANES and <4' SHOULDERS

Figure 4-11 Main Street Grade



4.3.1.1 MacDonough Drive/South Water Street/Main Street

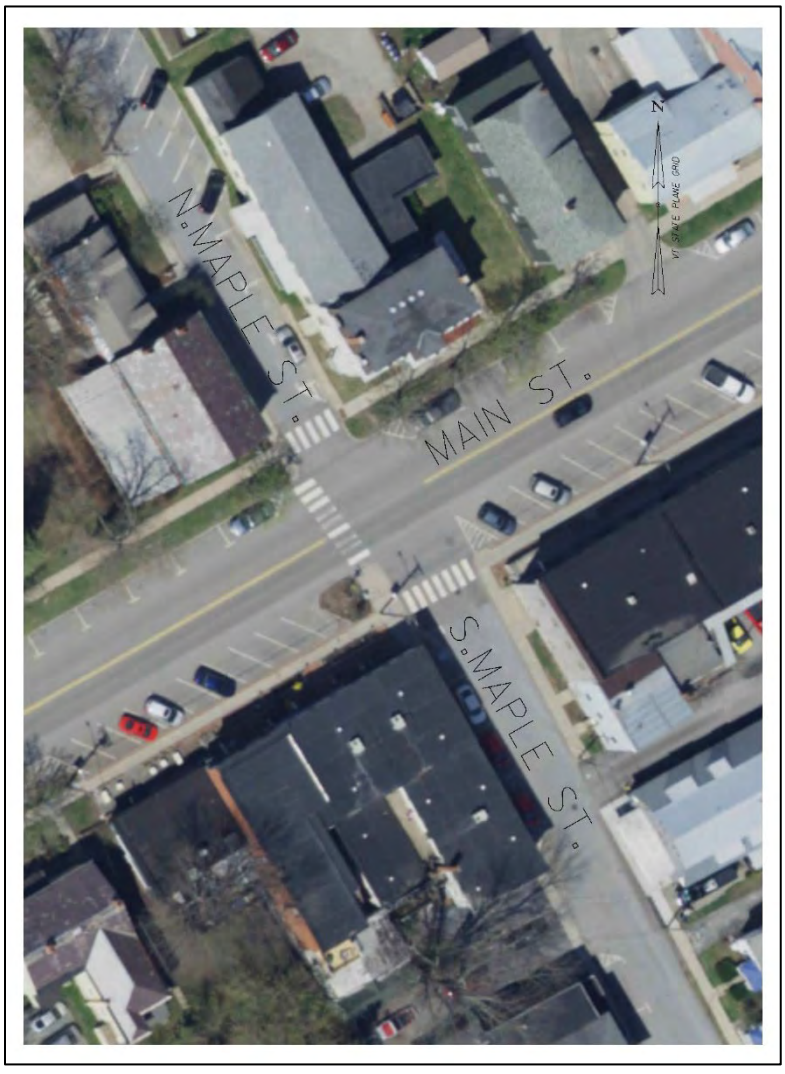
An aerial image of the four-way MacDonough Drive/South Water Street/Main Street intersection is provided in Figure 4-12. As shown, Main Street provides one travel lane in each direction at this intersection with on-street, parallel parking along the southbound approach. The MacDonough Drive approach (from the west) is under STOP sign control and includes one approach lane. The South Water Street, westbound approach, is also under STOP sign control with a shared through/left-turn lane and a dedicated right-turn lane. An overhead flashing beacon, yellow on Main Street and red on the side streets, reinforces the STOP-control condition. Head-in, 90-degree parking is allowed for commercial uses on both sides of South Water Street. Crosswalks are provided on the north and east intersection legs. Per Table 4-3 above, this intersection operates at LOS D during the PM peak hour with the longest delays experienced on the South Water Street approach.

Figure 4-12 MacDonough Drive/South Water Street/Main Street Intersection

4.3.1.2 Maple Street/Main Street

An aerial image of the four-way Maple Street/Main Street intersection is provided in Figure 4-13. As shown, Main Street provides one travel lane in each direction at this intersection with angle parking on the northbound side of the street and parallel parking on the southbound side. South Maple Street is one-way eastbound with parallel on-street parking permitted on the south side of the roadway. North Maple Street is one-way westbound with parallel parking on the north side of the street at the intersection approach. Crosswalks are provided on the south, west and east intersection legs.

Figure 4-13 Maple Street/Main Street Intersection



4.3.1.3 Green Street/Main Street

An aerial image of the four-way Green Street/Main Street intersection is provided in Figure 4-14. As shown, Main Street provides one travel lane in each direction at this intersection with angle parking on the northbound side of the street and parallel parking on the southbound side. Green Street west of Main Street is a two-lane, two-way road with angle parking on the westbound side and parallel parking on the eastbound side. Green Street east of Main Street is also a two-lane, two-way roadway with parallel parking on the south side and a Green Mountain Transit bus stop on the north side. The intersection is under traffic signal control. The signal operates with two phases separately serving: north/south vehicular traffic and east/west vehicular traffic. Crosswalks are provided on all intersection legs however there are no pedestrian signals at this location. Per Table 4-3 above, this intersection operates at LOS B during the PM peak hour.

Figure 4-14 Green Street/Main Street Intersection

4.3.1.4 East Street/Main Street

An aerial image of the East Street/Main Street intersection is provided in Figure 4-15. As shown, East Street enters Main Street from the east to create a T-type intersection. East Street is a one-way roadway and provides one travel lane westbound with parallel parking permitted on the south side. The East Street approach is under STOP sign control. Main Street provides one travel lane in each direction. South of the intersection there is angle parking permitted in the northbound direction and parallel parking in the southbound direction. North of the intersection parallel parking is permitted on both sides. A crosswalk is provided across East Street.

Figure 4-15 East Street/Main Street Intersection

4.3.1.5 Monkton Road/Main Street

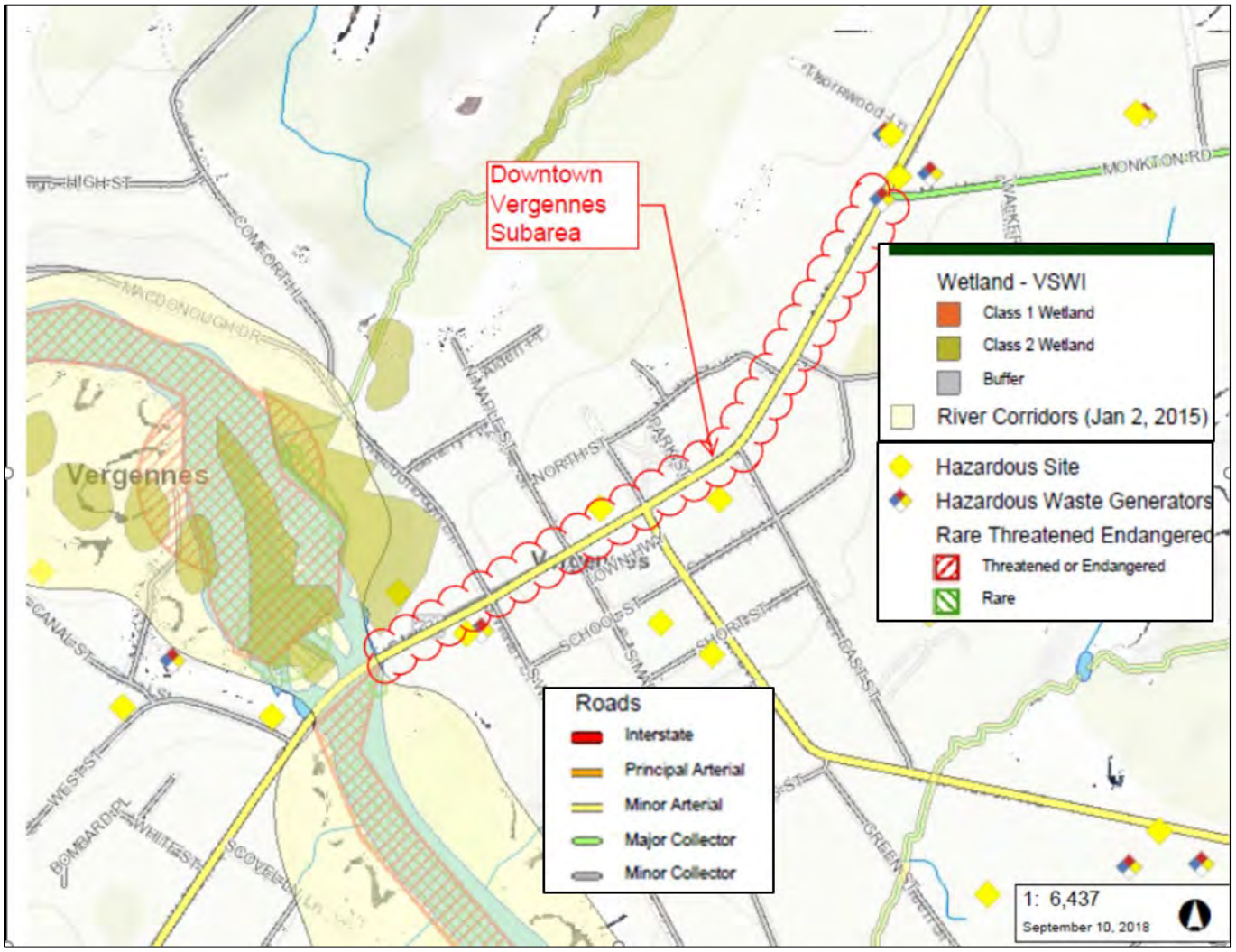
An aerial image of the three-way Monkton Road/Main Street intersection is provided in Figure 4-16. As shown, Main Street provides one travel lane in each direction at this intersection. No parking is allowed on the intersection approaches. Similarly, Monkton Road provides one travel lane in each direction with no parking allowed. The intersection is under traffic signal control. The signal operates with two phases separately serving: Main Street vehicular traffic and Monkton Road westbound vehicular traffic. Crosswalks are provided on the south and east intersection legs. Per Table 4-3 above, this intersection operates at LOS B during the PM peak hour.

Figure 4-16 Monkton Road/Main Street Intersection

4.3.2 Natural and Cultural Resources

Land within the downtown Vergennes subarea is heavily developed with limited natural areas. The land along Otter Creek abutting the Downtown Vergennes subarea is within range of two rare bat species. Hazardous waste sites are identified adjacent to Main Street. These sites are mapped in Figure 4-17. Also, some structures along Main Street and some parcels adjacent to Otter Creek have historic and archeological significance.

Figure 4-17 Natural and Cultural Resources – Downtown Vergennes Subarea



4.3.2.1 Wetlands

Since this subarea is primarily developed land, the only areas mapped as wetlands by the Vermont Significant Wetland Inventory (VSWI) in the subarea are comprised of Otter Creek and adjacent wetlands. Lower Otter Creek is a designated Section 10 waterway under the Rivers and Harbors Act of 1899.

4.3.2.2 Rare or Endangered Species

The Northern Long-eared Bat (*Myotis septentrionalis*) is a Federally and State listed species known throughout Vermont. No known hibernacula or maternal roosts are known within one mile of the subarea. In addition, the subarea is also within the observed summer range of the Indiana bat (*Myotis sodalis*), another Federally and State listed species. Several additional rare aquatic and terrestrial species are mapped within or along Otter Creek just outside of the subarea.

4.3.2.3 Farmland Soils of Statewide Importance

According to the ANR Natural Resources Atlas, there are soils within the Downtown Vergennes subarea mapped as Farmland Soils of Statewide Importance. State policy applying to these soils, the Farmland Policy Protection Act, does not apply to projects within existing roadway rights-of-way or urbanized areas.

4.3.2.4 Historic Resources

According to the 2014-2019 Vergennes Municipal Development Plan, the Vergennes Main Street Historic District is listed in the National Register of Historic Places. It includes archeologically sensitive areas of 18th and 19th century military occupation, including parcels along Otter Creek known as MacDonough's Shipyard and Fort William, as well as locations significant from the War of 1812.

4.3.2.5 Public Lands

The Downtown Vergennes Study Area does not include public lands developed with Land and Water Conservation Funds (LWCF, a Section 6(f) resource), but the Vergennes Falls Park adjacent to Otter Creek just downstream of the dam and VT 22A was developed, in part, with LWCF funds.

4.3.2.6 Hazardous Waste Sites

The ANR Natural Resources Atlas was reviewed for information on Hazardous Waste Sites. A few locations adjacent to the Main Street are considered Hazardous Sites or Hazardous Waste Generators. In urban areas these sites are typically associated with gas stations or other uses featuring hazardous chemicals.

4.4 VT 22A SUBAREA (OUTSIDE DOWNTOWN VERGENNES)

The VT 22A Subarea includes sections of VT 22A outside downtown Vergennes as noted in Figure 4-1. As shown, it includes a one-mile segment between US 7 and Monkton Road and six-mile segment between Otter Creek and VT 17. The north segment is relevant to this study as it is expected that for the New Alignment alternative, the northern terminus of the new roadway would intersect this section of VT 22A. Similarly, the southern terminus of the new alignment roadway would intersect VT 22A south of the downtown subarea.

4.4.1 Roadway Conditions

The northern section of the VT 22A (Outside Downtown Vergennes subarea) is a two-lane, two-way roadway classified as a minor arterial. The roadway cross section referenced above in Figure 4-10 varies by location. From Monkton Road to the Vergennes Police Station (just south of the railroad underpass) the cross section is substandard for truck traffic. The roadway is approximately 30 feet wide with 12 feet wide travel lanes and three feet wide paved shoulders. The posted speed limit is 30 mph. There are sidewalks on both sides of the roadway from the downtown area to approximately 1100 feet north of Monkton Road. North of this location the sidewalk continues only on the east side of the roadway for another 1600 feet to an enhanced crosswalk at the police station. The roadway shoulders widen north of the police station such that the section under the railroad and leading to US 7 satisfies VTrans standards for accommodating truck traffic.

Multiple commercial and residential driveways enter this roadway segment. The Ferrisburgh Park and Ride driveway meets VT 22A north of the railroad underpass and opposite Meigs Road at a two-way, STOP-control intersection.

The southern section of the VT 22A subarea is also a two-lane, two-way roadway classified as a minor arterial. The roadway cross section varies as noted above in Figure 4-10. Within Vergennes the roadway is typically 24 feet wide with no paved shoulders. The posted speed limit is 30 mph and abutting land uses are residential. There are sidewalks on both sides of the roadway from Otter Creek south to Panton Road. South of Panton Road the sidewalk continues on the east side only to Hopkins Road. This segment is on a long northbound downgrade leading to Otter Creek. South of the Vergennes City limit the roadway widens to approximately 32 feet with 11 feet wide travel lanes and five feet wide shoulders. The speed limit increases to 50 mph. The alignment is generally tangent through rolling terrain. Abutting land uses are low density residential and agricultural.

4.4.1.1 US 7/VT 22A

The VT 22A intersection with US 7 is the only major intersection located in the northern segment of this subarea. An aerial image of the intersection is provided in Figure 4-18. The VT 22A intersection with US 7 is under traffic signal control. This intersection includes separate lanes for all turning movements: one left-turn lane and one right-turn lane on VT 22A; one left-turn lane and one through lane on US 7 northbound; and, one channelized right-turn lane and one through lane on US 7 southbound. The signal operates with two phases serving US 7 and VT 22A approaches separately. There are no sidewalks or pedestrian signal indicators at this intersection. Per Table 4-3 above, this intersection operates at LOS B during the PM peak hour.

Figure 4-18 VT 22A/US 7 Intersection

4.4.1.2 Panton Road/VT 22A

Panton Road enters VT 22A from the west approximately 1200 feet south of the Otter Creek and opposite Elm Street to form a four-way intersection. There are single approach lanes on each leg of the intersection as shown in Figure 4-19. The Panton Road and Elm Street approaches are under STOP sign control. An overhead beacon provides a flashing red indication for the side streets and flashing yellow for VT 22A. There are sidewalks on at least one side of each leg of the intersection and crosswalks on the east, north and west legs. A sidewalk on the north side of Panton Road continues west approximately 2000 feet to First Street passing the Collins Aerospace facility. This is a major employer in the area and major traffic generator. Per Table 4-3 above, this intersection operates at LOS E during the PM peak hour with the longest delays experienced on the eastbound approach.

Figure 4-19 Panton Road/VT 22A Intersection

4.4.1.3 VT 17/VT 22A

Approximately six miles south of the Otter Creek, VT 17 crosses VT 22A in Addison. At this four-way intersection STOP sign control is provided on the VT 17 approaches reinforced with overhead flashing red beacons on VT 17 and flashing yellow beacons on VT 22A. All intersection approaches have a single lane as shown in Figure 4-20. There are no sidewalks or crosswalks present at this intersection. Abutting land uses include a church, a general store, a commercial/agricultural business and a residence. Per Table 4-3 above, this intersection operates at LOS C during the PM peak hour with the longest delays experienced on the eastbound approach.

Figure 4-20 VT 17/VT 22A Intersection

4.5 VT 17 SUBAREA

The VT 17 Subarea includes the 7.3-mile section of VT 17 between VT 22A in Addison and US 7 in New Haven. Under Alternative C, this roadway section would carry the through truck traffic that now passes through downtown Vergennes on VT 22A. The roadway would also be upgraded to accommodate the new truck traffic.

4.5.1 Roadway Conditions

VT 17 is a two-lane, two-way roadway. VTrans Route Logs classify the roadway as a minor arterial however, a 2018 updated VTrans highway functional classification map identifies certain sections in New Haven and Weybridge as major collectors. The typical roadway section as noted in Figure 4-10 includes two 11-feet wide travel lanes and two to three feet wide paved shoulders within a 65.5-feet right-of-way. The bridge over Otter Creek was recently reconstructed. The bridge now includes 11-feet wide travel lanes and four-feet wide shoulders. The roadway is generally posted for 45 mph however, lower, advisory speed limits are posted at sharp horizontal and vertical curves. Sharp horizontal and vertical curves are located in Figure 4-21. Seven locations are noted where vertical grades along the roadway exceed six percent and at three of these locations grades exceed ten percent. Finally, there are four cross streets, Otter Creek Road Eastbound, Hallock Road Eastbound, Pearson Road Westbound and Daniels Road Westbound where a combination of vertical grades, horizontal curvature and/or roadside obstructions result in unsafe sight lines for a 45-mph driving speed.

Figure 4-21a VT 17 Design Deficiencies

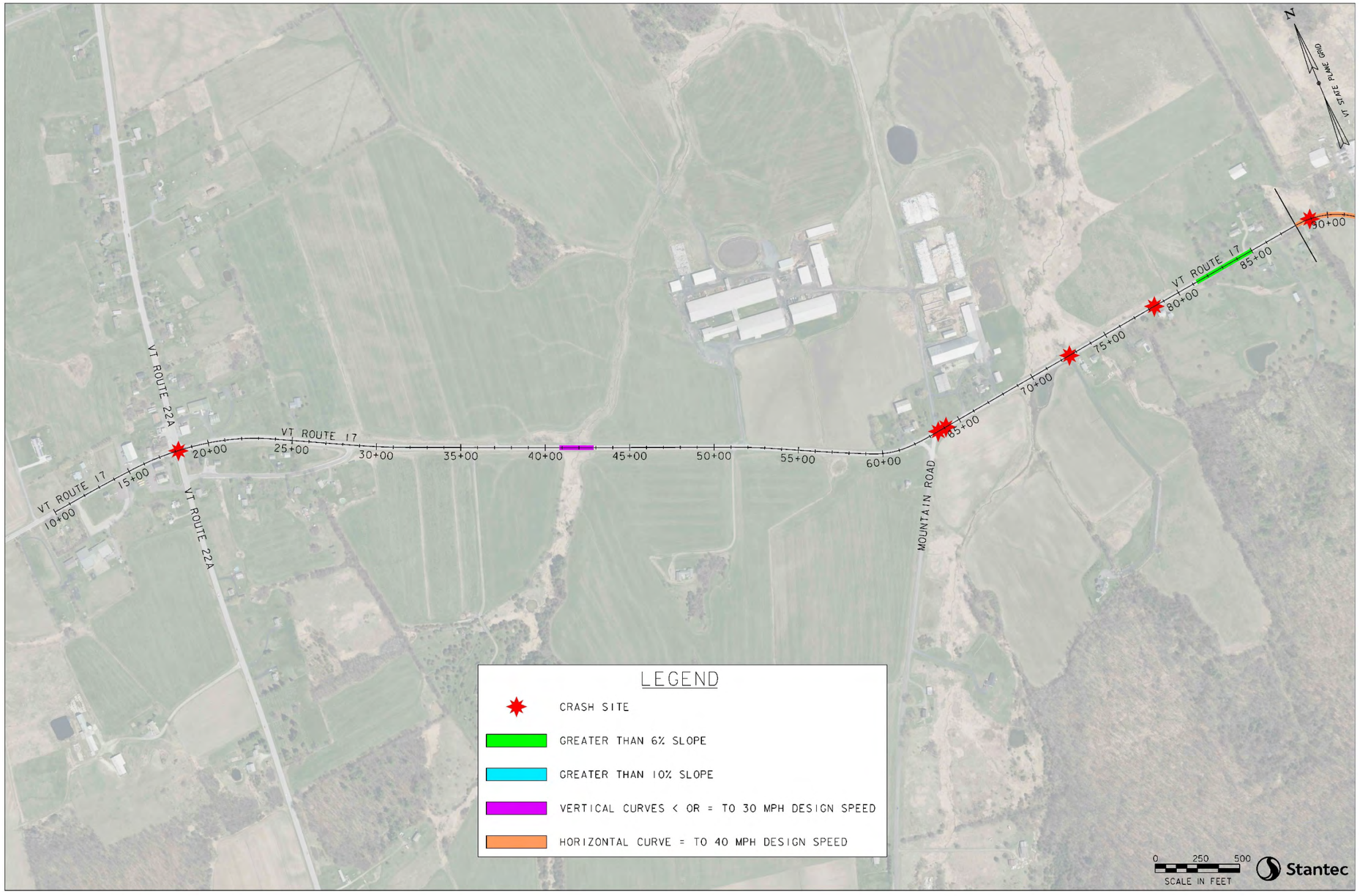


Figure 4-21b VT 17 Design Deficiencies

Figure 4-21c VT 17 Design Deficiencies

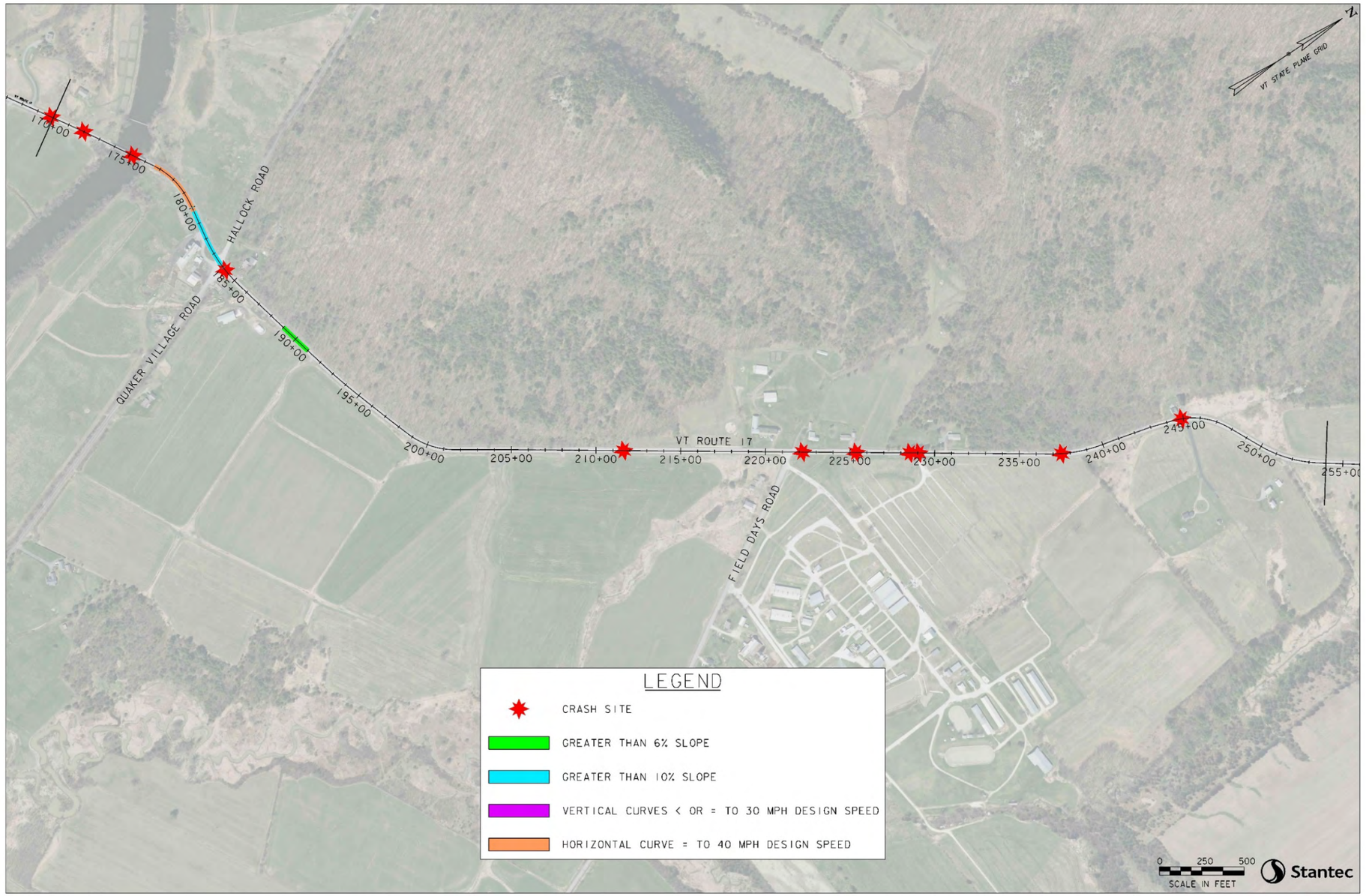


Figure 4-21d VT 17 Design Deficiencies

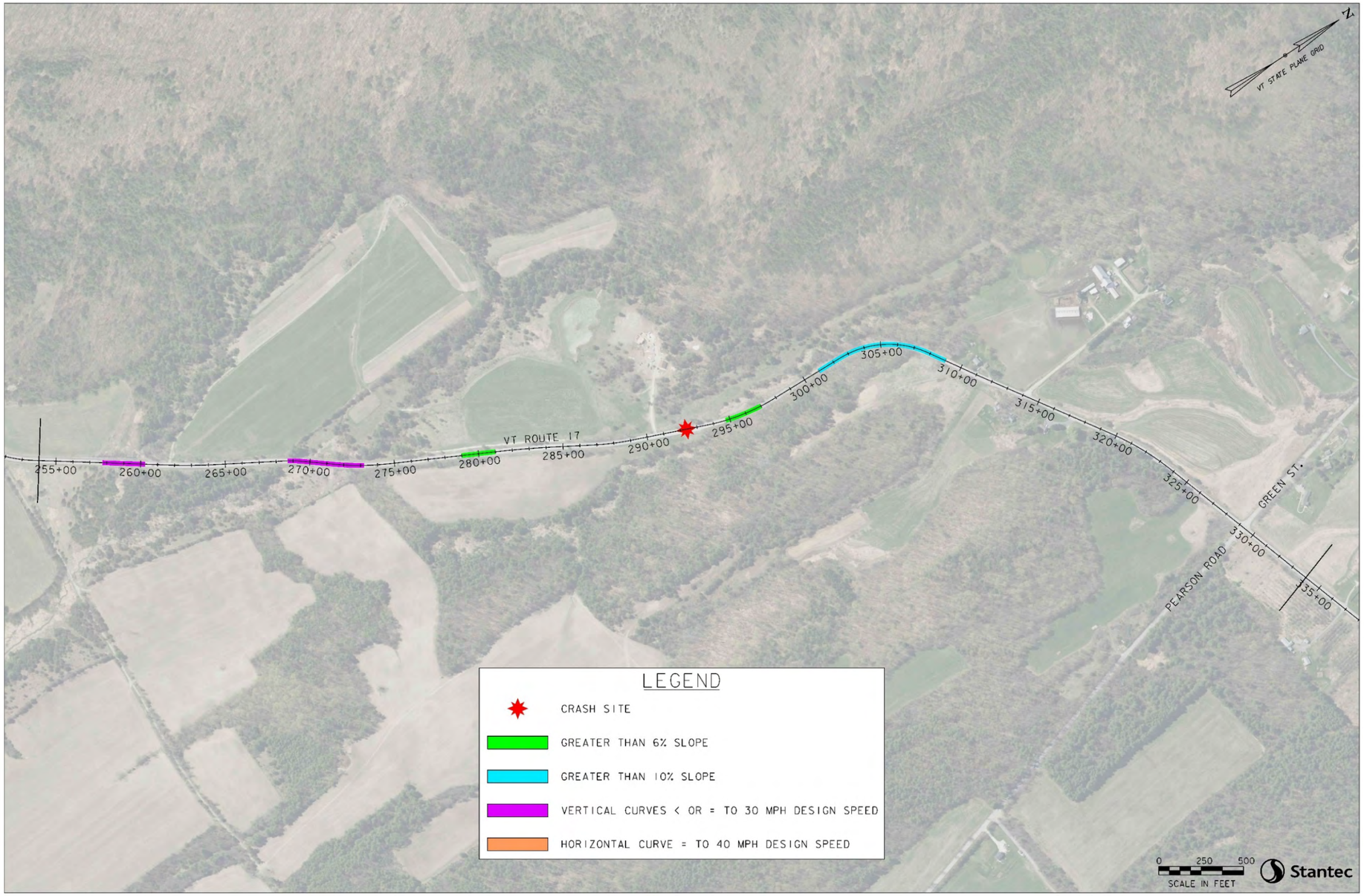
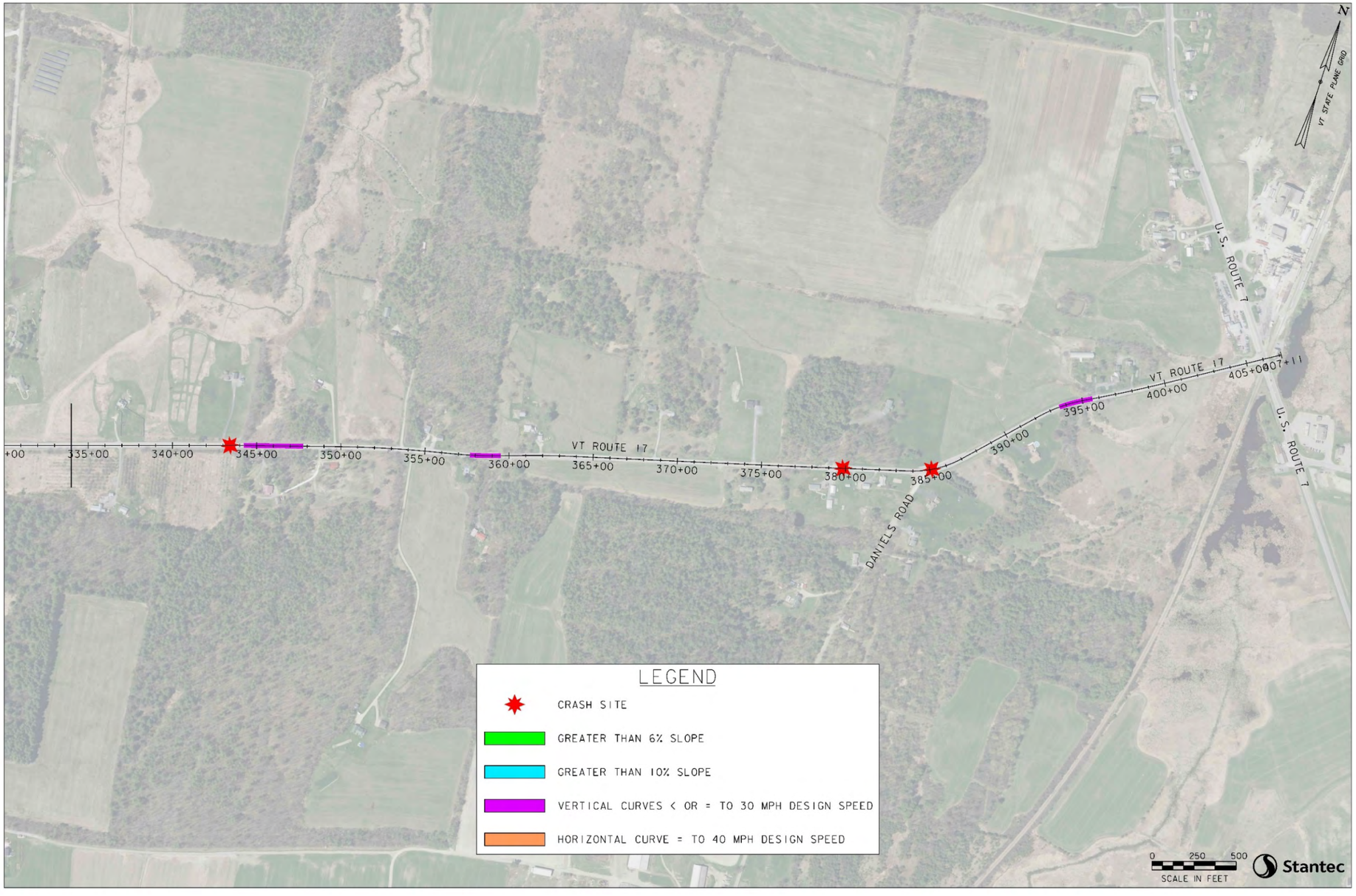


Figure 4-21e VT 17 Design Deficiencies



4.5.1.1 VT 17/US 7

The VT 17 enters US 7 from the west to form an unsignalized T-type intersection. The VT 17 approach is under STOP sign control. There is a railroad crossing on the US 7 south leg of the intersection as shown in Figure 4-22. The railroad crosses US 7 at an angle such that the tracks meet US 7 directly opposite the VT 17 eastbound approach. All approaches have overhead railroad warning lights. The westbound and southbound approaches are single lane approaches. The northbound US 7 approach has a through lane and a dedicated left turn lane for traffic destined to VT 17. Just north of the intersection there is a climbing lane on US 7 to accommodate slow moving trucks on an uphill grade. There are no sidewalks or crosswalks at this intersection. Abutting land uses include a former railroad depot on the east side of the intersection, an auto repair center north of VT 17 and undeveloped land south of VT 17. Phoenix Feeds operates from the former railroad depot and generates significant truck traffic. Per Table 4-3 above, this intersection operates at LOS B during the PM peak hour. One crash was reported at this intersection over the 2013 to 2017 survey period. As reported above, the 0.3-mile segment of US 7 that passes through this intersection was classified as a High Crash Location segment by VTrans for the period 2012 to 2016. There are no apparent sight distance constraints at this location.

Figure 4-22 VT 17/US 7 Intersection

4.5.2 Natural and Cultural Resources

The Route 17 subarea includes VSWI wetlands and streams. Otter Creek in this area is a designated Section 10 waterway under the Rivers and Harbors Act of 1899. Several rare species have been identified within this subarea and it is within range of two rare bat species. In addition, the subarea includes Prime Agricultural Soils and Agricultural Soils with Statewide Significance. There are older structures along VT 17 that may have historic significance. Finally, this subarea includes mapped Hazardous Waste Sites. Natural and cultural resources located within or adjacent to this subarea are mapped in Figures 4-23 and 4-24.

Figure 4-22 Natural and Cultural Resources – VT 17 Subarea

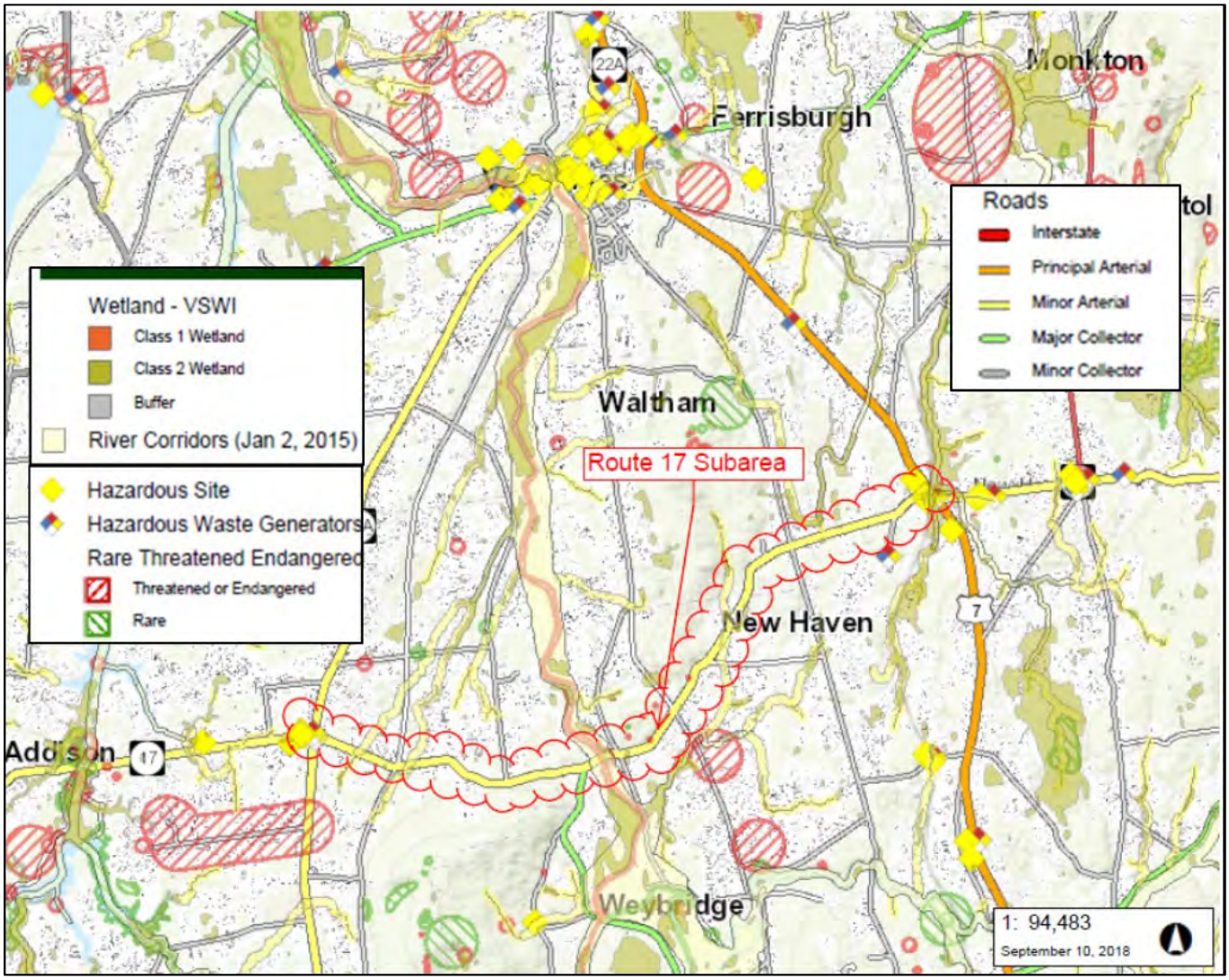
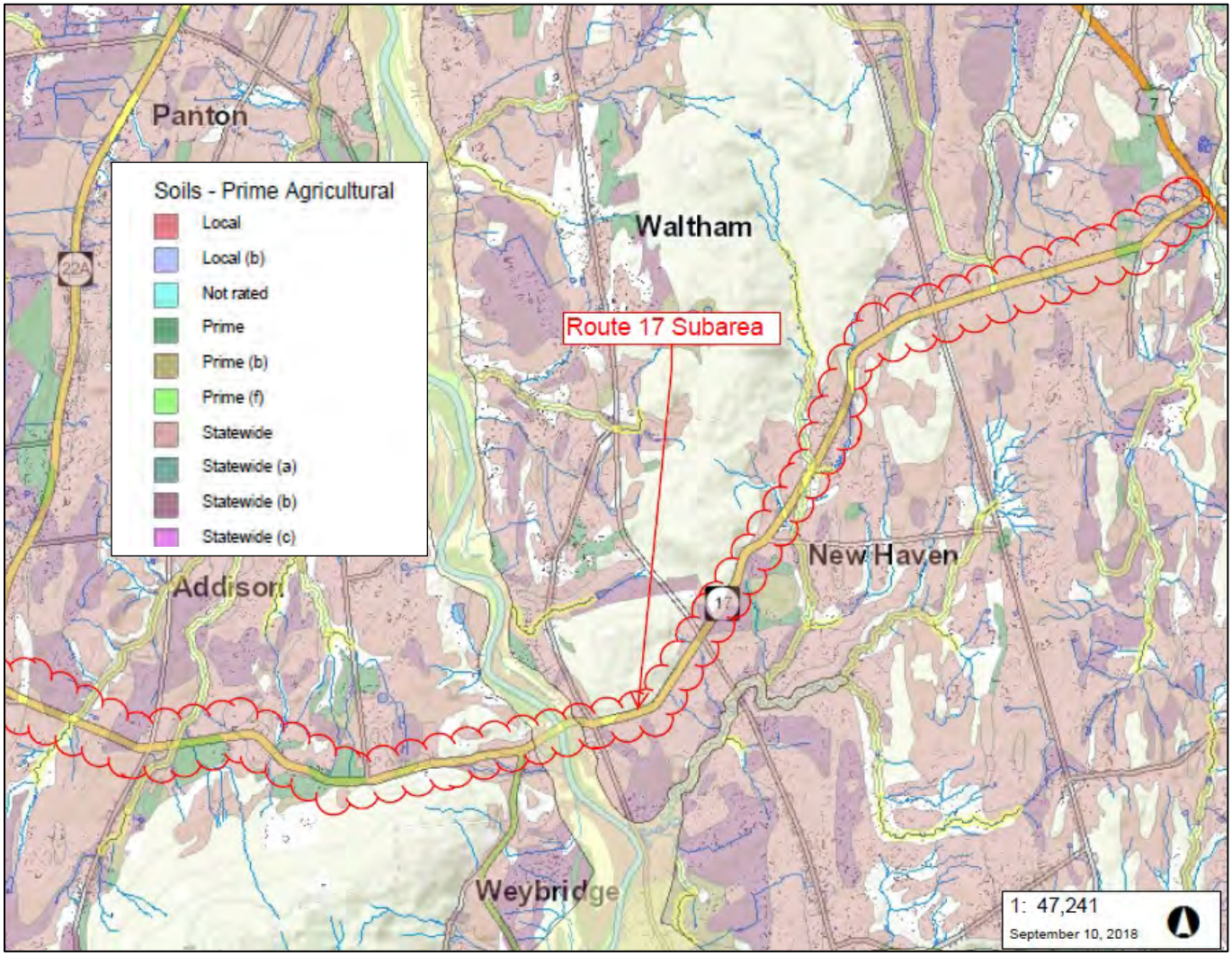


Figure 4-23 Agricultural Soils Mapping – VT 17 Subarea



4.5.2.1 Wetlands

There are several VSWI wetlands adjacent to Route 17 in the subarea. In addition, Route 17 crosses over Otter Creek and wetlands adjacent to it. Several other streams and tributaries cross under Route 17, including tributaries to Otter Creek, Mud Creek, and Little Otter Creek.

4.5.2.2 Rare or Endangered Species

Several rare species are mapped within the subarea. The Northern Long-eared Bat is a Federally and State listed species known throughout Vermont. No known hibernacula or maternal roosts are known within one mile of VT 17. This subarea is also within the observed summer range of the Indiana bat, another Federally and State listed species, and this species was historically found in this area. Several rare species are mapped within or along Otter Creek in the subarea.

4.5.2.3 Farmland Soils of Statewide Importance

There are soils within the subarea mapped as Prime Agricultural Soils and Farmland Soils of Statewide Importance. The Farmland Policy Protection Act does not apply to projects within existing highway right-of-way. If any work is proposed outside of existing right-of-way, authorization from the NRCS via form CPA-106, the Farmland Conversion Impact Rating form for corridor projects, may be required.

4.5.2.4 Historic Resources

Just to the west of this Subarea is the Addison Baptist Church, which is on the National Registry of Historic Places. It qualifies as a Section 4(f) resource. To the east of Route 7, just east of this Subarea is the New Haven Junction Depot, another Section 4(f) resource. Some structures within this Subarea have historic significance.

4.5.2.5 Public Lands

The Route 17 subarea does not include known historic or public recreation lands (Section 4(f) resources) or public lands developed with Land and Water Conservation Funds (Section 6(f) resources).

4.5.2.6 Hazardous Waste Sites

A few locations at the west and east ends of the VT 17 subarea are considered Hazardous Sites or Hazardous Waste Generators.

4.6 US 7 SUBAREA

US 7 between VT 17 in New Haven and VT 22A in Ferrisburgh would carry through truck traffic that now passes through downtown Vergennes on VT 22A under Alternative C. This is a 5.3-mile roadway segment.

4.6.1 Roadway Conditions

US 7 is a two-lane, two-way roadway classified as a major arterial. The typical roadway section as noted in Figure 4-10 includes two 12-feet wide travel lanes and five-feet wide paved shoulders. The terrain is generally rolling and climbing lanes are provided on steeper sections as noted in Figure 4-10. One such section is on US 7 northbound just north of its intersection with VT 17. The roadway is generally posted for 50 mph however, a lower speed, 40 mph is posted in advance of the VT 17 intersections. The major intersections along the roadway include junctions with VT 22A at the northern end of the study area and VT 17 at the southern end of the study area. (These two intersections were described above.) Monkton Road crosses US 7 at a signalized intersection near the northern end of the study area. There are at-grade rail crossings of US 7 at the VT 17 intersections and just north of Monkton Road. The roadway passes through a

rural area. Abutting land uses including agricultural land, low-density residential development, undeveloped land, and commercial properties.

4.6.1.1 Monkton Road/US 7

Monkton Road crosses US 7 approximately 0.9 miles south of the VT 22A/US 7 intersection. The intersection is under traffic signal control. As shown in Figure 4-25, the eastbound and westbound Monkton Road approaches are single lane approaches. The northbound US 7 approach has a through lane and a dedicated left turn lane. The southbound US 7 approach has three lanes with a right-turn lane, a through lane and left-turn lane. The signal provides protected intervals for US 7 left turn movements. There are no sidewalks or crosswalks at this intersection. Abutting land uses are commercial in all four quadrants including a solar farm in the southwest quadrant. Per Table 4-3 above, this intersection operates at LOS C during the PM peak.

Figure 4-24 Monkton Road/US 7 Intersection

4.7 NEW ALIGNMENT SUBAREA

An alignment for a new roadway that would circumvent downtown Vergennes to the west and north has been assumed for analysis purposes. The assumed alignment, shown in Figure 4-26 would leave VT 22A near the Vergennes/Panton municipal boundary to the south and rejoin VT 22A just south of the existing railroad underpass. The roadway would cross over the Otter Creek and have at-grade intersections with Panton Road, MacDonough Drive and Comfort Hill Road. A 32-feet wide roadway cross section is assumed, matching the US 7 cross section. The roadway would be constructed within a minimum 60-feet wide right-of-way. The assumed roadway alignment indicates a 2.6-mile new roadway. The assumed roadway alignment is just one of several alignments that could be considered and does not represent a recommended alignment. It is presented and analyzed to help quantify the costs and benefits that would be associated with such a roadway.

4.7.1 Roadway Conditions

As noted above, a 32-feet wide roadway is assumed. It would be designed to VTrans standards for a major arterial with a design speed of 45 mph. By design, the posted speed limit, roadway length, and traffic controls at proposed intersections, would result in a longer travel time for passenger cars relative to travel on VT 22A through downtown Vergennes. New intersections would be constructed at the three roadway crossings referenced above.

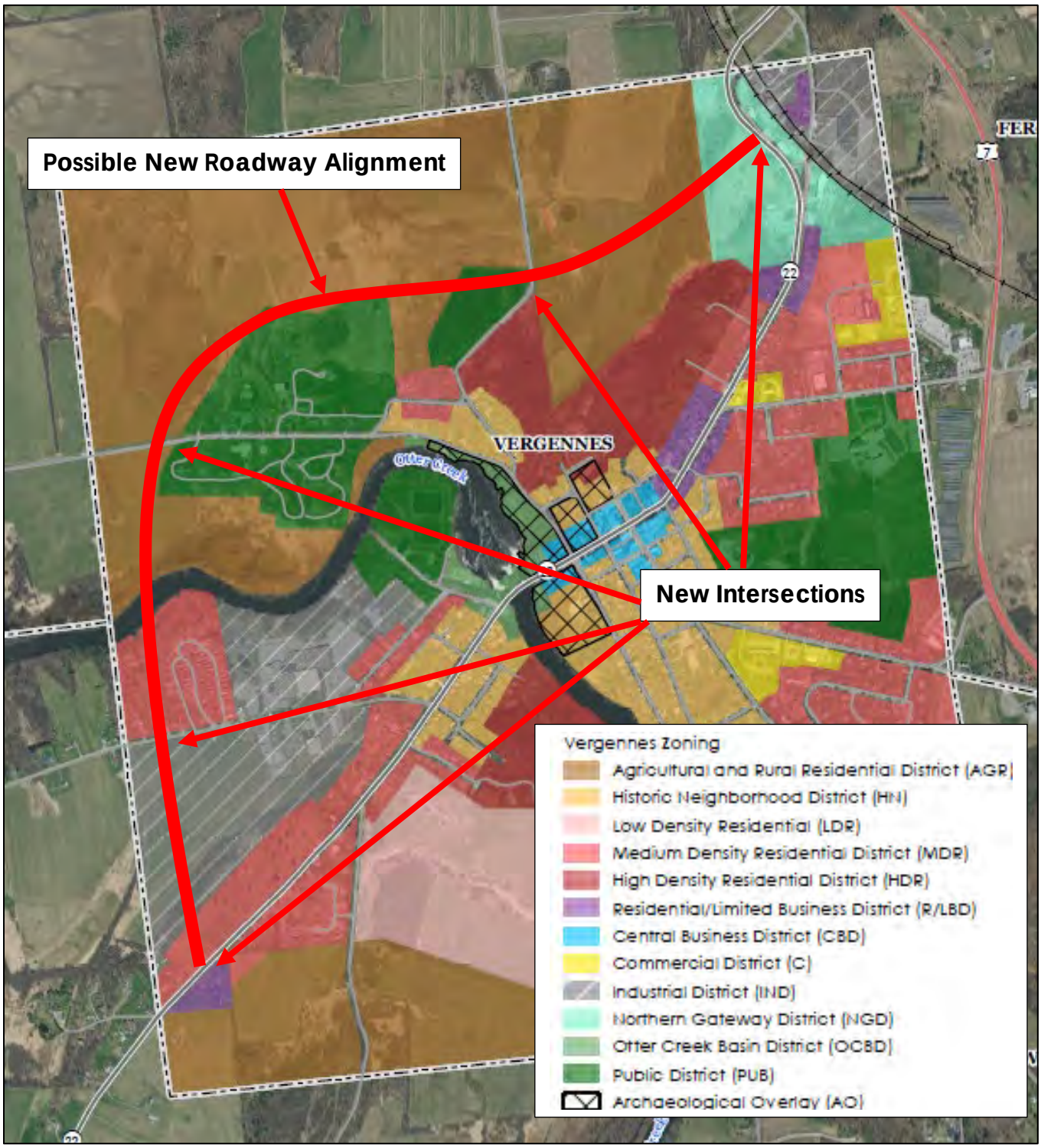
4.7.2 Traffic Volumes

Vehicular traffic volumes on Panton Road, MacDonough Drive and Comfort Hill Road will influence the design of the intersections of these roadways with the New Alignment roadway. As presented above, the daily traffic volume is 4100 vehicles on Panton Road. Intersection turning movement counts for the MacDonough Drive/Main Street intersection indicate a daily volume of approximately 600 vehicles on MacDonough Drive in the vicinity of the proposed New Alignment crossing. Traffic count data are not available for Comfort Hill Road. Volumes on this roadway are assumed to be comparable to the volumes on MacDonough Drive.

4.7.3 Zoning/Land Use

Figure 4-26 shows the proposed New Alignment roadway passing through multiple zoning districts in the City of Vergennes. The Industrial District and two medium density residential districts are crossed at the southern end of the alignment, south of Otter Creek. North of Otter Creek the roadway would pass through the Agricultural and Rural Residential District and could have contact with the Public District. The northern terminus of the New Alignment Roadway is in the Northern Gateway District. As shown, the assumed roadway alignment purposely avoids developed parcels to the extent possible. However, it is likely that several residential properties would be impacted south of the Otter Creek. The New Alignment abuts the Northlands Job Corps Facility, operated by a contractor to the US Department of Labor on lands owned by the State of Vermont on MacDonough Drive.

Figure 4-25 New Alignment Subarea and Land Use Conditions



4.7.4 Natural and Cultural Resources

The New Alignment subarea is principally undeveloped or farmland. The Alternative Alignment subarea includes VSWI wetlands and streams. Several rare species have been identified within this subarea, and it is within range of two rare bat species. In addition, the subarea includes Prime Agricultural Soils and Agricultural Soils with Statewide Significance. Finally, this subarea includes conserved lands with easements granted to the Vermont Land Trust. Natural and cultural resources located within or adjacent to this subarea are mapped in Figures 4-27 and 4-28.

Figure 4-26 Natural and Cultural Resources – New Alignment Subarea

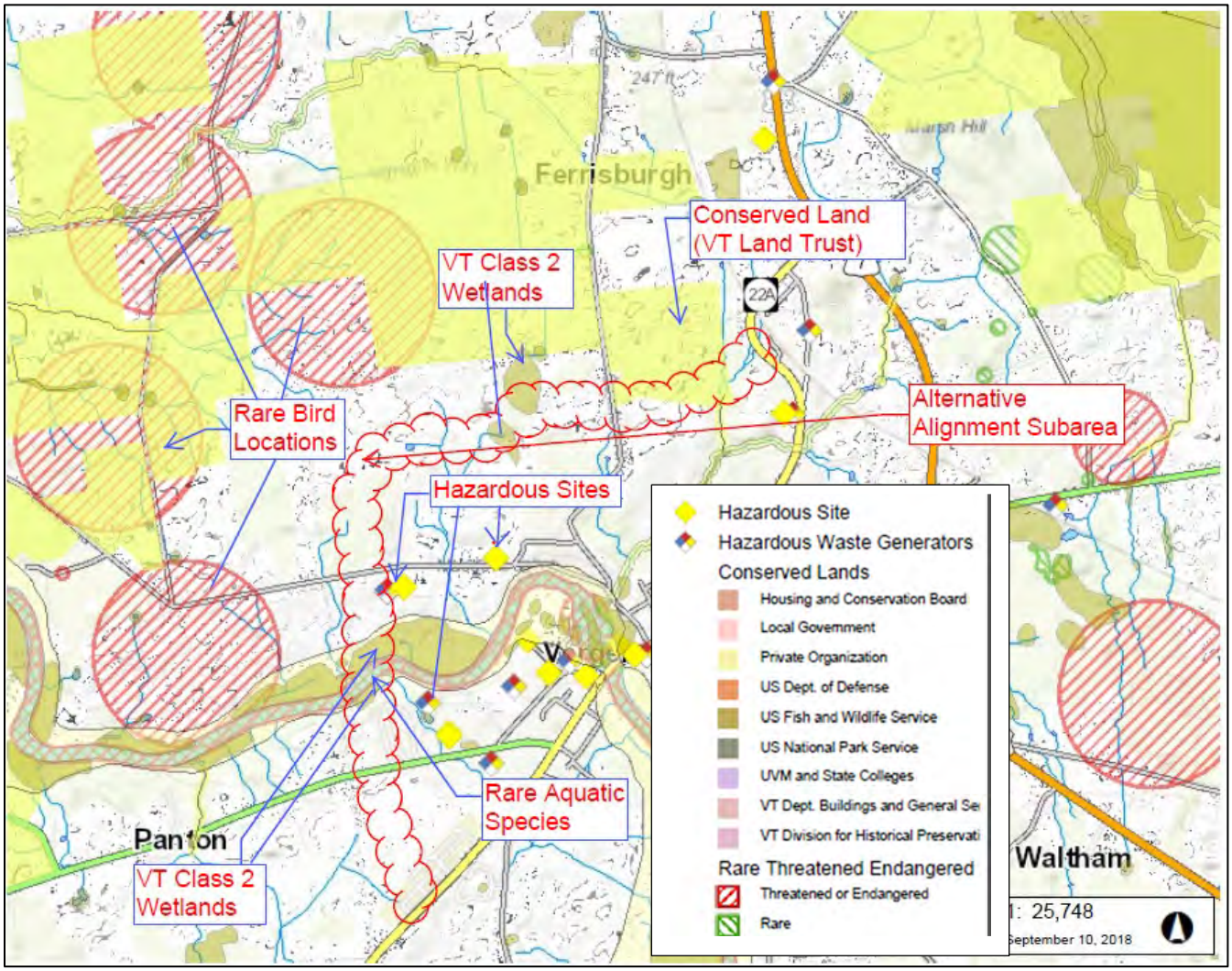
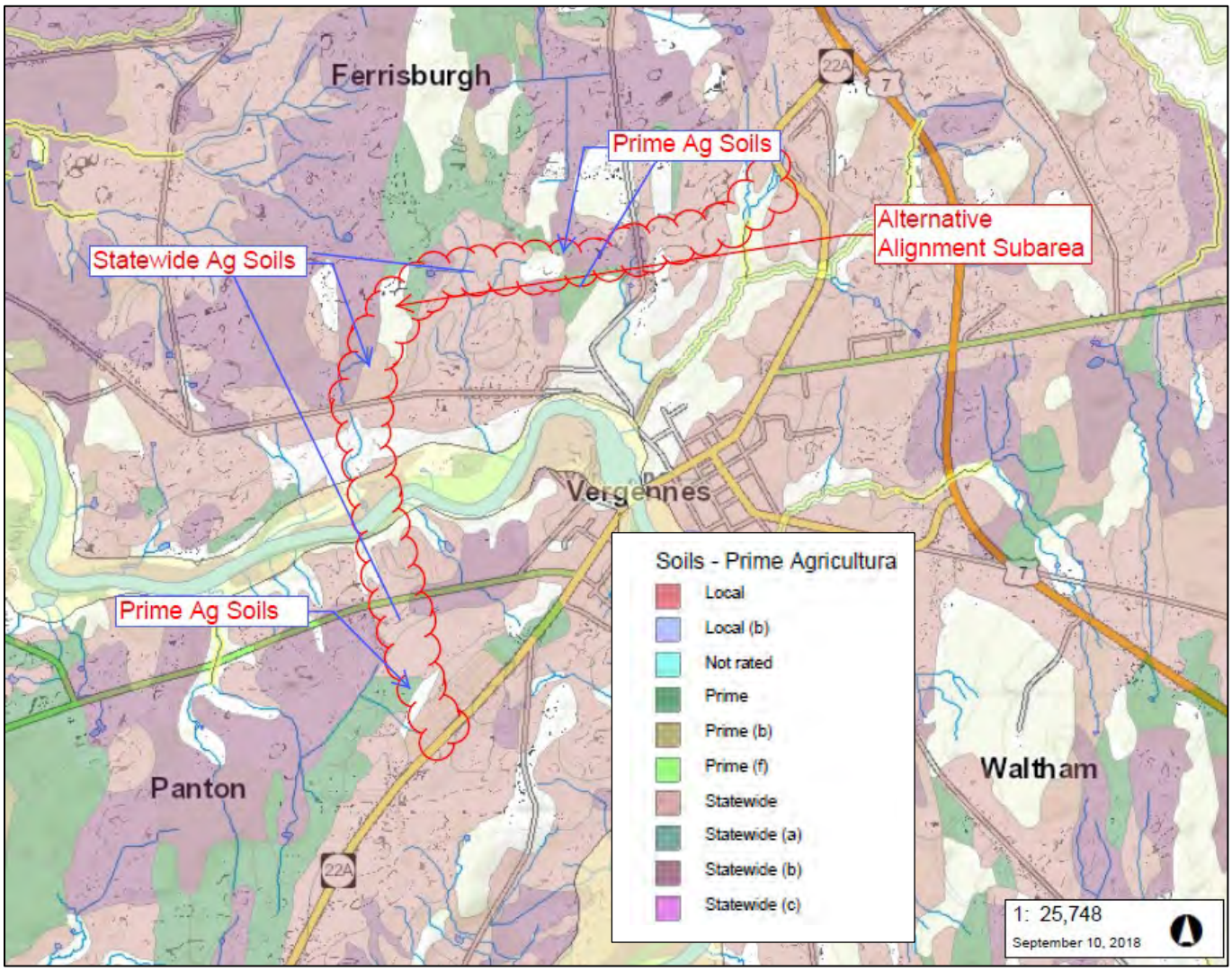


Figure 4-27 Agricultural Soils Mapping – New Alignment Subarea



4.7.4.1 Wetlands

The Alternative Alignment subarea is sparsely developed with farms and residences. The undeveloped areas include a mixture of farmland, forest, shrub, and grass habitats, as well as the Otter Creek floodplain. There are several VSWI wetlands within the subarea. In addition, this alignment crosses over Otter Creek and wetlands adjacent to it. Several other streams and tributaries cross this alignment.

4.7.4.2 Rare or Endangered Species

Several rare species are mapped within or along Otter Creek in the subarea. In addition, the Northern Long-eared Bat is a Federally and State listed species known throughout Vermont. No known hibernacula or maternal roosts are known within one mile of the subarea. The subarea is

also within the observed summer range of the Indiana bat, another Federally and State listed species.

4.7.4.3 Farmland Soils of Statewide Importance

There are soils within the subarea mapped as Prime Agricultural Soils and Farmland Soils of Statewide Importance.

4.7.4.4 Historic Resources

There are no historic resources mapped in the New Alignment subarea.

4.7.4.5 Public Lands

The Alternative Alignment subarea does not include known public recreation lands (Section 4(f) resources) or public lands developed with Land and Water Conservation Funds (Section 6(f) resources). However, it does cross conserved lands with easements granted to the Vermont Land Trust.

4.7.4.6 Hazardous Waste Sites

There are no Hazardous Waste Sites mapped within the Alternative Alignment subarea.

5.0 FUTURE CONDITIONS

Existing traffic conditions in the study area were projected to a future design year of 2043 for the more critical peak hour, the PM peak hour. The 2043 design year reflects a 25-year forecast consistent with the VTrans Project Development Process guidelines for roadway projects. Intersection operations analyses were conducted applying the projected future traffic volumes and associated roadway system changes. The scenarios analyzed include:

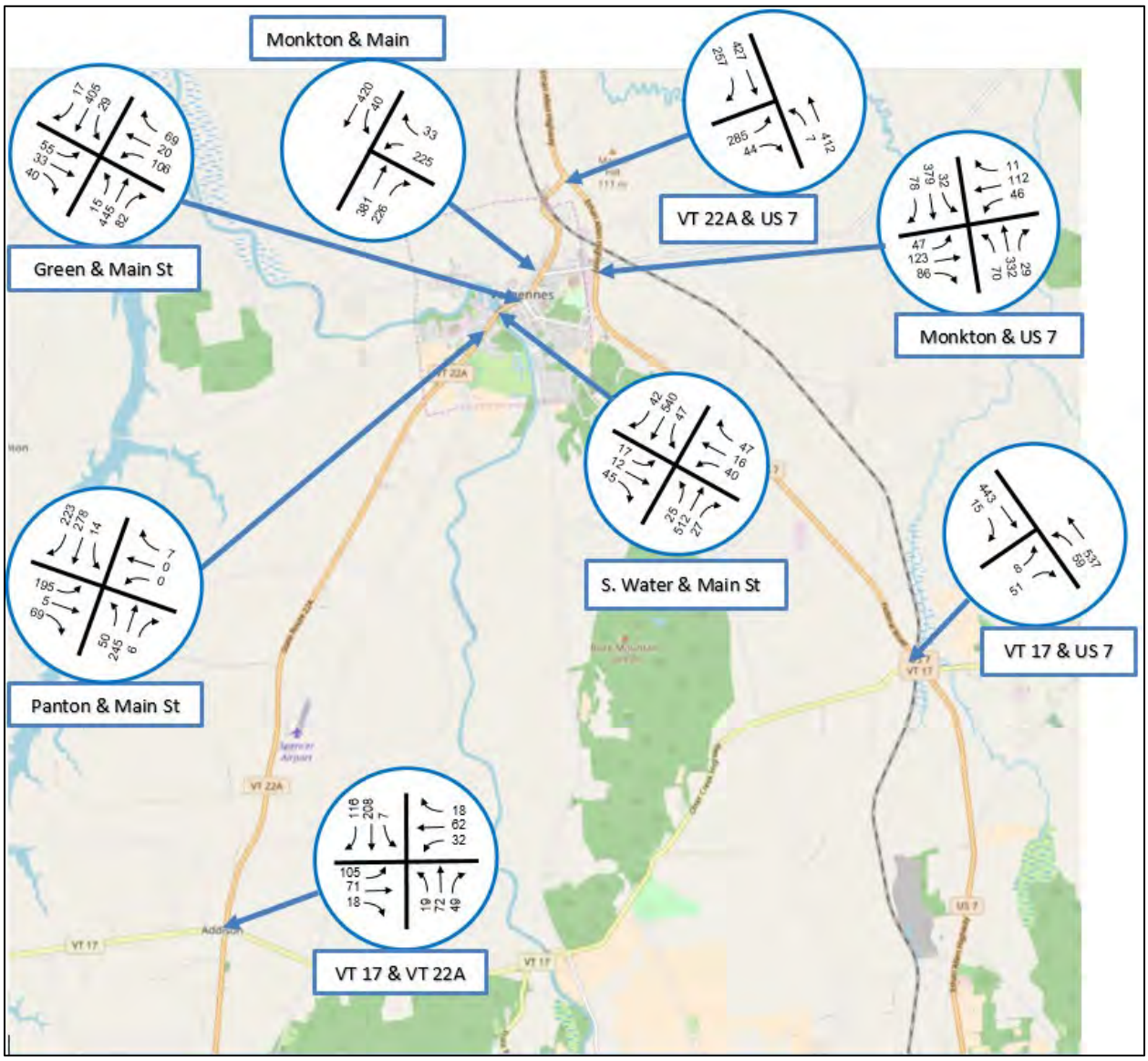
- No Build;
- Alternative A – In Line Alternative;
- Alternative B – New Alignment Alternative;
- Alternative C – VT 17 Truck Route; and
- Alternative B – New Alignment Alternative with Induced Development.

Traffic and roadway assumptions for each scenario are described below.

5.1 NO BUILD CONDITION

The No Build condition assumes that no changes are made to the existing transportation system. It is simply assumed that traffic volumes increase in accordance with traffic forecasts develop by VTrans. The VTrans Redbook compiles traffic data from continuous count stations around the state and uses the data to forecast future traffic growth rates. The Redbook anticipates traffic growth of 11 percent by the 2043 design year. This rate was applied to existing non-truck traffic on the roadway network. The VTrans freight study predicts a 50 percent increase in truck volumes by 2043. The 50 percent factor was accordingly applied to existing truck trips. The combined effect is an overall 13 percent increase in existing PM peak hour volumes on the traffic network by 2043. The predicted 2043 No Build PM peak hour volumes are shown in Figure 5-1.

Figure 5-1 Figure 2043 No Build PM Peak Hour Traffic Volumes



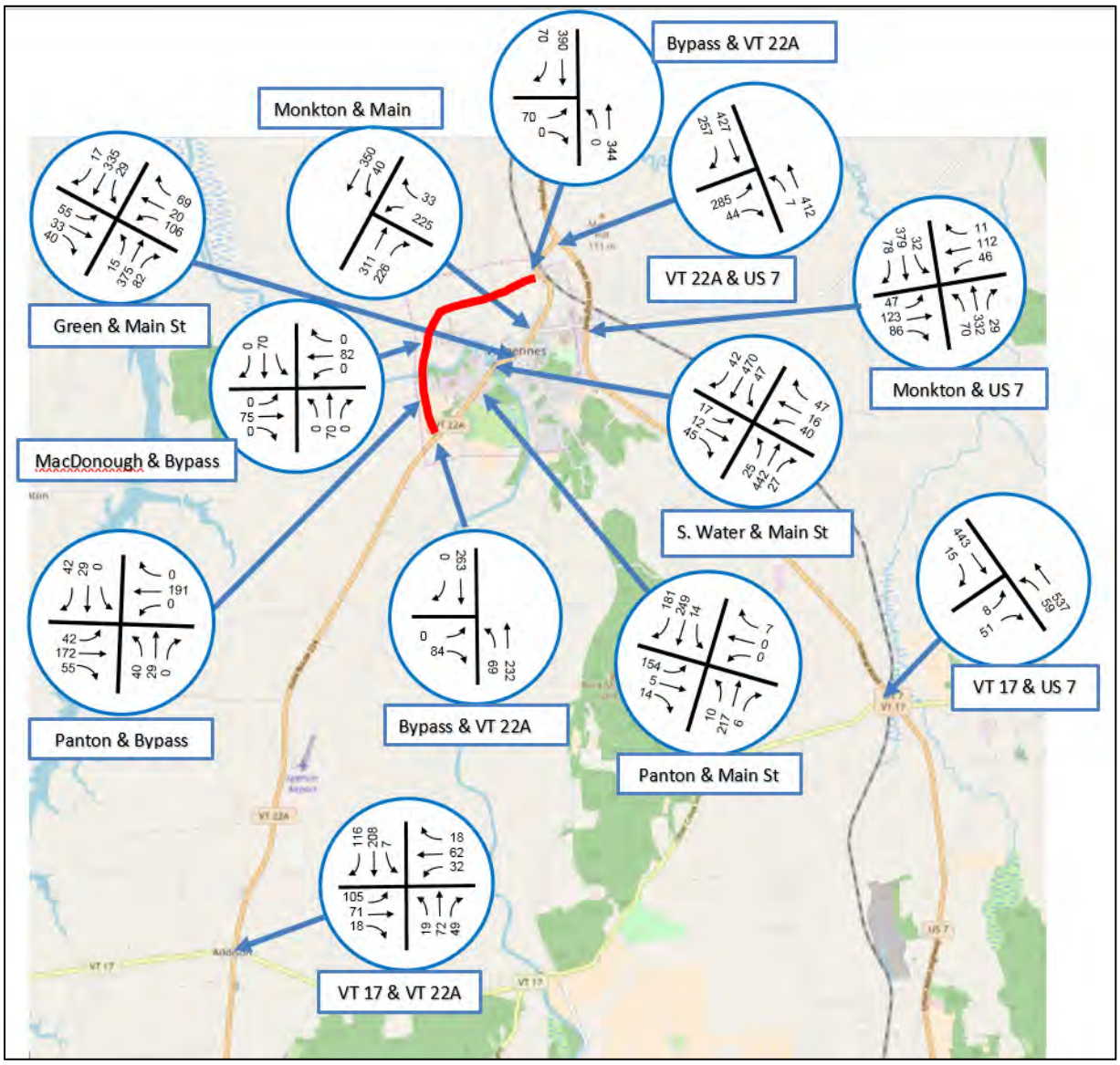
5.2 ALTERNATIVE A – IN LINE ALTERNATIVE

Under Alternative A, traffic volume forecasts are the same as for the No Build condition. There is potential for a modest amount of existing freight shipments to shift from truck to rail under Alternative A however, the shift would occur gradually over time and would not be large enough to significantly impact peak hour operations. Assumed roadway and traffic control conditions under Alternative A are consistent with existing conditions except for one change. Signalization of the Panton Road/Elm Street/VT 22A intersection is assumed.

5.3 ALTERNATIVE B – NEW ALTERNATIVE ALIGNMENT

Traffic forecasts for the New Alignment alternative, Alternative B, build upon the No Build traffic forecasts described above. For Alternative B, the 2043 No Build traffic volumes were adjusted to reflect possible traffic reassignments with a new roadway in place. Estimated future through truck traffic volumes passing through downtown Vergennes were reassigned to the suggested new roadway. Also, some non-truck traffic using Panton Road was also assigned to the new roadway as the roadway would create a shortcut between VT 22A north and south of downtown Vergennes and Panton Road. 80 percent of the vehicle trips between Panton Road and VT 22A south of Panton Road were reassigned to the New Alignment roadway. Likewise, 20 percent of the trips between Panton Road and VT 22A north of Panton Road were assigned to the New Alignment roadway. Projected 2043 PM peak hour traffic volumes for Alternative B are shown in Figure 5-2.

Figure 5-2 2043 Alternative B PM Peak Hour Traffic Volumes



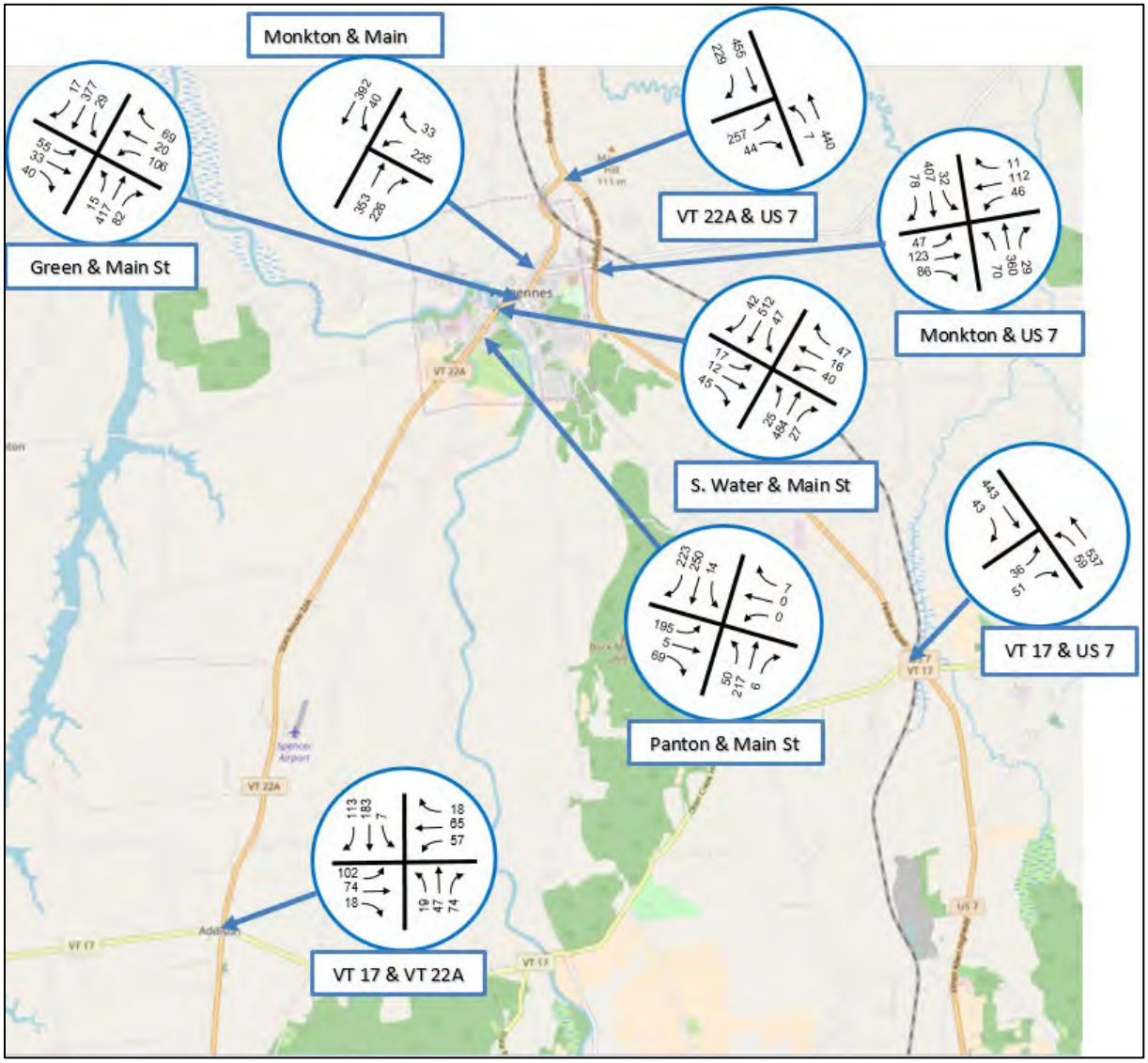
Future roadway conditions assumed for Alternative B include the new traffic signal at Panton Road considered for Alternative A and construction of the proposed new alignment roadway. Construction of the new alignment roadway will create new intersections that were analyzed as well. These include intersections with MacDonough Drive and Panton Road. For these two intersections, single lane approaches under STOP sign control are assumed for the New Alignment roadway. Another two intersections are added north and south of downtown Vergennes where the New Alignment roadway would meet with VT 22A. For the northern intersection, the assumed geometry includes a single approach lane on the New Alignment Roadway and a dedicated southbound right-turn lane on VT 22A. For the southern intersection, the assumed geometry includes a single approach lane on the New Alignment Roadway and a

dedicated northbound left-turn lane on VT 22A. The new alignment roadway will also intersect Comfort Hill Road. Conditions at this intersection were not analyzed however, Comfort Hill Road is a relatively low-volume roadway such that operations at its intersection with the new alignment roadway would be comparable to or better than conditions at the new alignment roadway/McDonough Drive intersection.

5.4 ALTERNATIVE C – VT 17 TRUCK ROUTE

Traffic forecasts for the Alternative C also build upon the No Build traffic forecasts described above. For Alternative C, the 2043 No Build traffic volumes were adjusted to reflect the reassignment of future through truck traffic volumes passing through downtown Vergennes to an alternative route by way of VT 17 and US 7. From a roadway perspective, the future operations analyses assume signalization of the Panton Road/Elm Street/VT 22A intersection as proposed under Alternative A. The predicted 2043 Alternative C PM Peak Hour traffic volumes are shown in Figure 5-3.

Figure 5-3 2043 Alternative C PM Peak Hour Traffic Volumes



5.5 ALTERNATIVE B WITH INDUCED DEVELOPMENT

A final future roadway and traffic scenario analyzed builds upon the Alternative B scenario. This additional scenario, Alternative B with Induced Development, assumes that construction of the New Alignment roadway will lead to new development along the roadway and that this new development will increase area traffic demands. For this scenario, Alternative B traffic volumes were increased to account for potential new development. The potential new development vehicle trips were assigned to the roadway network and combined with the forecasted Alternative B volumes to create the Alternative B with Induced Development traffic conditions.

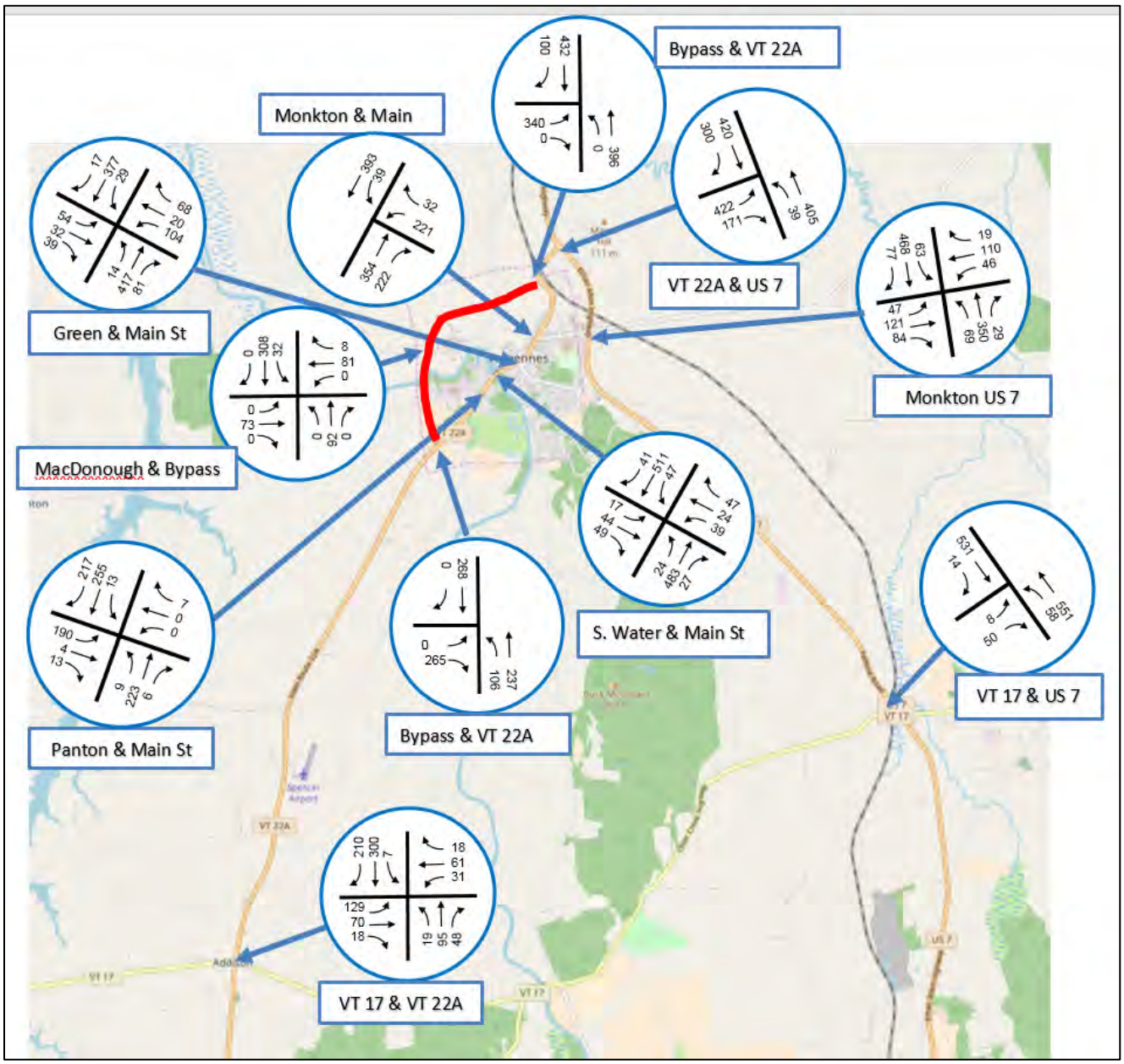
New development related traffic forecasts are based on an assumed land use plan for properties abutting the possible bypass roadway. The economic impact analyses provided in this study considers several possible future land use conditions along the New Alignment roadway. For the traffic analysis, a simplified approach was applied. The existing Collins Aerospace facility on Panton Road was used as a template for assumed future development. Based on an examination of potential development sites along the possible bypass roadway it was assumed that four new comparable facilities could be built. Traffic forecasts for four new facilities were developed and assigned to the roadway system. Traffic volume data for Exchange Street in Middlebury, a nearby roadway providing access to a mix of commercial development, was then examined to check the validity of the traffic forecasts.

As noted, the existing Collins Aerospace facility was used as model for projecting future site traffic. Vehicle trip generation rates published by the Institute of Transportation Engineers (ITE) were applied to this facility. The Collins Aerospace facility occupies approximately 25 acres. Based on ITE vehicle trip generation rates published in Trip Generation, 9th Edition, the 25-acre property generates approximately 215 PM peak hour vehicle trips with 80 percent of the trips entering the site and 20 percent of the trips exiting the site. (These estimates are consistent with the existing peak hour traffic volumes reported on Panton Road assuming that most of Collins Aerospace facility traffic passes through the Panton Road/VT 22A intersection.) Building another four developments, similar to the Collins Aerospace facility, would generate approximately 800 new PM peak hour trips. These estimated trips were assigned to the suggested future roadway network according to the trip distribution pattern shown in Table 5-1. This pattern reflects existing travel demands on the transportation system. The resulting future PM peak hour traffic flows for Alternative B with Induced Development are shown in Figure 5-4. This indicates a peak hour volume of 440 vehicles per hour on the New Alignment roadway where it meets VT 22A north of downtown Vergennes. This forecast is reasonable when compared to volumes on Exchange Street in Middlebury. Exchange Street, a 1.5-mile roadway providing access to a mix of industrial and institutional uses, carries approximately 350 PM peak hour vehicle trips.

Table 5-1 Trip Distribution Pattern for Potential New Development Along the New Alignment Roadway

Origin/Destination	Route	Percentage of New Traffic
US 7 North of Vergennes	Via New Alignment Roadway and VT 22A	30%
Monkton Road East of US 7	Via New Alignment Roadway, VT 22A and Monkton Road	5%
Panton and West	Via New Alignment Roadway and Panton Road	15%
Vergennes and Waltham	Via New Alignment Roadway, McDonough Drive and South Water Street	5%
VT 22A South of Addison	Via New Alignment Roadway and VT 22A	15%
VT 17 West of Addison	Via New Alignment Roadway and VT 22A	15%
US 7 South of VT 17	Via New Alignment Roadway, VT 22A and Monkton Road	15%
	Total	100%

Figure 5-4 2043 Alternative B with Induced Development PM Peak Hour Traffic Volumes



Assumed roadway conditions for the Alternative B with Induced Development traffic scenario are similar to those assumed for Alternative B (without induced development) with one exception. For Alternative B with Induced Development it is assumed that the New Alignment Roadway/VT 22A intersection north of downtown Vergennes is under traffic signal control. (The bypass road approach to this intersection would operate at LOS F under PM peak hour conditions without traffic signal control.)

5.6 FUTURE TRAFFIC OPERATIONS

The traffic operations analysis for future conditions are reported in Table 5-2 and compared to results for existing conditions. Key findings from the operations analysis are described below.

5.6.1 No Build Condition

Assumed traffic growth under No Build conditions measurably changes PM peak hour traffic operations at three locations.

- PM peak hour delays on the critical South Water Street approach to Main Street increase from 29 seconds (LOS D range) to 46 seconds (LOS E range). Even under No Build conditions however, the South Water Street approach operates at only 56 percent of capacity.
- Operations on the Panton Road eastbound approach to Main Street decline from LOS E to LOS F with demands reaching 93 percent of capacity.
- Traffic operations on the westbound VT 17 approach to VT 22A decline from LOS B to LOS C.

5.6.2 Alternative A

Traffic volume conditions under Alternative A are the same as under the No Build condition. Consequently, intersection operating levels of service are the same under Alternative A conditions as they are under No Build conditions expect where traffic control changes are proposed. For Alternative A, a new traffic signal is proposed at the Panton Road/VT 22A intersection improving PM peak hour operations from LOS F to LOS B.

5.6.3 Alternative B

Under Alternative B traffic volumes on Main Street in downtown Vergennes are lower than expected under No Build conditions as nearly all truck traffic and some passenger car traffic are diverted to the bypass roadway. With the traffic diversions, downtown intersections operate slightly better than they would under No Build conditions as evidenced by lower volume-to-capacity ratios. The new intersections created by the bypass roadway would all operate at LOS C or better.

Table 5-2 Future PM Peak Hour Intersection Levels of Services

	Existing			No Build			Alternative A In-Line			Alternative B New Alignment			Alternative C Route 17 Bypass			Alternative B With Induced Development		
Intersection/Approach(es)	**LOS[1]**	**Delay[2]**	**V/C[3]**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**
Signalized Locations:																		
US 7/VT 22A																		
All	B	10	0.56	B	11	0.62	B	11	0.62	B	11	0.62	B	10.2	0.62	B	17	0.80
Monkton Road/Main Street																		
All	B	18	0.53	C	21	0.60	C	21	0.60	B	19	0.55	B	20	0.58	B	19	0.55
Green Street/Main Street																		
All	B	12	0.67	B	15	0.77	B	15	0.77	B	14	0.70	B	14	0.74	B	14	0.70
Monkton Road/US 7																		
All	C	24	0.45	C	25	0.52	C	25	0.52	C	25	0.52	C	26	0.53	C	28	0.58
Unsignalized Locations																		
S. Water St./MacDonough Dr./Main St.																		
Westbound (Existing)	D	29	0.37	E	46	0.56	E	46	0.56	D	32	0.43	E	39	0.50	E	40	0.54
All (Signalized)	-	-	-	-	-	-	B	19	0.54	B	17	0.49	B	18	0.52	B	17	0.51
Panton Road/VT 22A[4]																		
Eastbound (Panton Road)	E	36	0.71	F	71.0	0.93	-	-	-	-	-	-	-	-	-	-	-	-
Westbound (Elm Street)	A	10	0.01	A	10	0.01	-	-	-	-	-	-	-	-	-	-	-	-
All							B	16	0.65	B	14	0.53	B	15	0.62	B	14	0.53
VT 17/VT 22A																		
Eastbound (VT 17)	C	18	0.41	C	22	0.52	C	22	0.52	C	22	0.52	C	20	0.49	F	54	0.82
Westbound (VT 17)	B	15	0.24	C	17	0.30	C	17	0.30	C	17	0.30	C	18	0.37	C	24	0.41
VT 17/US 7																		
Eastbound (VT 17)	B	13	0.11	B	14	0.14	B	14	0.14	B	14	0.14	D	27	0.35	C	16	0.16
MacDonough Dr/New Alignment Roadway																		
Northbound (New Roadway)	-	-	-				-	-	-	B	11	0.11	-	-	-	B	11	0.22
Southbound (New Roadway)	-	-	-				-	-	-	B	11	0.11	-	-	-	C	18	0.60
Panton Road/New Alignment Roadway																		
Northbound (New Roadway)	-	-	-				-	-	-	C	16	0.19	-	-	-	E	42	0.58

	Existing			No Build			Alternative A In-Line			Alternative B New Alignment			Alternative C Route 17 Bypass			Alternative B With Induced Development		
Intersection/Approach(es)	**LOS[1]**	**Delay[2]**	**V/C[3]**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**
Southbound (New Roadway)	-	-	-				-	-	-	B	12	0.13	-	-	-	D	35	0.79
VT 22A North/New Alignment Roadway[5]																		
Eastbound (New Roadway)	-	-	-				-	-	-	C	18	0.21	-	-	-	-	-	-
All	-	-	-				-	-	-	-	-	-	-	-	-	B	13	0.56
VT 22A South/New Alignment Roadway																		
Eastbound (New Roadway)	-	-	-				-	-	-	B	10	0.12	-	-	-	B	13	0.40

[1] LOS= Level of Service
[2] Delay = Average delay expressed in seconds per vehicle
[3] V/C = Volume-to-capacity ratio
[4] Intersection is unsignalized under Existing and No Build conditions and assumed to be signalized for Alternatives A, B and C.
[5] Intersection is unsignalized except under Alternative B with Induced Development

5.6.4 Alternative C

Alternative C will also lower traffic volumes slightly on Main Street in downtown Vergennes as nearly all truck traffic would be diverted from this roadway segment. Again, downtown intersections will exhibit slightly lower volume-to-capacity ratios relative to No Build conditions. At intersections along US 7 where traffic volumes are expected to increase as a consequence of the truck reassignments, only one location is expected to experience a decrease in the operating level of service. Operations on the eastbound approach of VT 17 to US 7 decline from LOS B under No Build PM peak hour conditions to LOS D under Alternative C conditions. The volume-to-capacity ratio on the eastbound VT 17 approach to US 7 remains well below one at 0.35 under Alternative C PM peak hour conditions.

5.6.5 Alternative B with Induced Development

Under Alternative B there is potential for parcels along the bypass roadway to be developed or redeveloped in ways that could substantially increase traffic demands on the study area roadway system. When these added traffic demands are considered, several intersections are expected to experience lower operating levels of service relative to the Alternative B scenario with no induced development. The expected changes are noted below.

- The VT 17/VT 22A intersection eastbound approach operates at LOS C under future PM peak hour conditions under Alternative B and at LOS F under Alternative B with Induced Development traffic. The volume-to-capacity ratio on this approach will remain below one at 84 percent.

- The VT 17/US 7 intersection eastbound approach operates at LOS B under future PM peak hour conditions under Alternative B and at LOS C under Alternative B with Induced Development.

- The bypass road southbound approach to MacDonough Drive will experience a decline in level of service from LOS B to LOS C with Induced Development under Alterative B.

- The bypass road approaches to Panton Road are expected to operate at LOS C or better during the PM peak hour under Alternative B. With Induced Development under Alternative B the northbound approach would operate at LOS E and the southbound approach would operate at LOS D.

- The new alignment roadway northbound approach to VT 22A north of downtown Vergennes operates at LOS F during the PM peak hour with travel demands exceeding capacity under Alternative B with Induced Development.

5.6.6 Recommendations

Based on the intersection capacity analysis results certain actions are recommended.

- Under No Build conditions, some PM peak hour congestion (LOS E operations), is expected at the McDonough Drive/South Water Street/Main Street intersection. Signalization would address the congestion issue as noted in a prior study however, it may also worsen Main Street traffic operations by requiring trucks and passenger cars to stop on a steep grade. Consequently, a "wait and see" strategy is recommended for this location. It is recommended that traffic signal conduit to be installed at this intersection to facilitate future installation of a signal should the need become more apparent in the future.

- The analysis results indicate that traffic control improvements are warranted at the Panton Road/Elm Street/VT 22A intersection to address PM peak hour congestion under No Build conditions. Installation of a traffic signal or modern roundabout is recommended as proposed in a prior study.

- For Alternative A, no additional improvements are warranted based on the operations analysis other than those recommended above for No Build conditions. Traffic signal control is assumed for the Panton Road/Elm Street/VT 22A intersection when analyzing traffic operations under Alternative A.

- For Alternative B, STOP-controlled intersections with MacDonough Drive, Panton Road and VT 22A (north and south) will provide adequate capacity. No additional improvements are warranted based on the operations analysis other than those recommended above for No Build conditions.

- For Alternative C, various improvements are proposed along VT 17 to improve its traffic carrying capacity and safety. No additional improvements are warranted based on the operations analysis other than those recommended above for No Build conditions. (These include installing traffic signal conduit at the McDonough Drive/Main Street intersection and installing a signal at the Panton Road/Main Street intersection.

- For Alternative B with Induced Development the operations analysis indicates that congestion issues may arise if the assumed new development is realized. The assumed new development and related traffic growth would occur gradually over an extended period. Consequently, there will be adequate opportunity to monitor traffic operations before taking action. Future monitoring should be conducted to determine the need for:

    - Enhanced traffic controls (signalization) at the VT 17/VT 22A intersection where LOS F operations are projected for the PM peak hour;

    - Enhanced traffic controls (signalization) and/or added lanes at the proposed bypass road/Panton Road intersection where LOS E operations are projected for the PM peak hour; and,

    - Installation of a traffic signal at the proposed bypass road/VT 22A North intersection assuming that a roundabout is not built at this location.

6.0 PURPOSE AND NEED

The evaluation of alternative actions is guided by a Purpose and Need Statement. The *VTrans 2017 Project Definition Process Guidebook for Highway Division Projects* defines a Purpose and Need Statement as "a problem statement used to define the reasons for the project and its goals, or what it hopes to accomplish or correct". The Purpose component "defines the transportation problem to be solved, and outlines the goals and the objectives of a specific project." The Need component "identifies the transportation problem(s) to be addressed; defines causes of existing problems; and uses factual, quantifiable data to the extent possible to explain the asset or system need".

The Purpose and Need Statement of the July 2002 *Greater Vergennes Traffic Impact Feasibility Study Needs Assessment,* which was developed through an extensive community engagement process, was used as the starting point for drafting a Purpose and Need Statement for the current study. The project Management Team made minor revisions to the 2002 statement and presented it to the Addison County TAC. The Addison County TAC offered additional revisions.

Purpose: Enhance the economic vitality and quality of life in downtown Vergennes by reducing the noise, vibration, fume and dust impacts of truck traffic while:

- Maintaining a high level of service for the movement of freight in the region;
- Minimizing and/or mitigating traffic impacts to other transportation corridors;
- Minimizing property and environmental resource impacts in neighboring communities;
- Supporting the continued movement of non-truck traffic through Downtown Vergennes; and,
- Providing a cost-effective use of resources.

Need: Vergennes is Vermont's oldest city and its 200+ year heritage is visible in the striking architecture of the historic buildings that line Main Street. Main Street is a regional shopping and dining destination featuring a city green surrounded by an eclectic mix of businesses and sidewalk cafes. The vibrancy of the downtown and further business development however, are hampered by the rumbling of large trucks up and down the steep grade that leads from downtown to the Otter Creek. The magnitude and impact this truck traffic are described below.

- Up to 800 daily trucks have been recorded on Main Street in downtown Vergennes.
- Most of the truck traffic, up to 535 trucks per day, are large tractor trailer units.
- The 2017 Vermont State Commodity Flow study prepared by the Two Rivers Ottauquechee Planning Commission indicates that three to six trucks per hour pass through downtown Vergennes carrying hazardous materials.

- The most recent Vermont Freight Plan[6] predicts growth in truck traffic on VT 22A of 40 to 60 percent between 2007 and 2035.
- Existing truck volumes in Vergennes are much higher than those experienced in other historic Vermont cities. For comparison: US 7 in Brandon carries 190 large trucks per day; US 4 in Woodstock carries 140 large trucks per day; and, VT 116 in Bristol carries 50 large trucks per day.
- Trucks must negotiate a very steep, 11 percent, grade heading north through downtown from the Otter Creek bridge.
- Historic buildings are located with 35 feet of the roadway edge. The City recently spent $2 million renovating the historic Vergennes Opera House and looks to protect this investment from the vibration impacts caused by truck traffic.
- Outdoor dining at several restaurants is within 22 feet of trucks traveling on Main Street.
- The state of Vermont has finite financial resources available to address a myriad of transportation system concerns across the state. Investments made in this corridor must be cost-effective with respect to competing projects elsewhere in the state.

The above Purpose and Need Statement guided the development and evaluation of alternative strategies to address truck traffic impacts in Vergennes.

7.0 ALTERNATIVES ANALYSIS

Three principal alternative strategies were considered to address the project Purpose and Need Statement. These include:

- **Alternative A - VT 22A Truck Route (In-Line Alternative):** VT 22A would continue to function as the principal north/south truck route in western Vermont however, modifications would be made to VT 22A in Vergennes to allow for safer pedestrian and bicycle movements and smoother truck operations with fewer vehicle starts and stops. In addition, efforts would be made at the state level to shift more freight shipments from truck to rail.
- **Alternative B - New Alignment Truck Route:** A new road would be constructed on an alignment that bypasses downtown Vergennes to the northwest and through trucks would be restricted from using VT 22A through downtown Vergennes.

[6] Cambridge Systematics, Inc. May 2012. *Vermont Freight Plan*

- **Alternative C - VT 17 Truck Route.** VT 17 would be reconstructed to more safely accommodate truck traffic. Through trucks would be restricted from passing through downtown Vergennes on VT 22A and directed to VT 17 between VT 22A and US 7.

Separate report sections are provided below describing and evaluating each alternative. For each alternative there is a detailed description of the proposal and a qualitative discussion of its impacts. Project implementation costs related to design, permitting, right-of-way and construction are also presented. The lump sum implementation costs are then converted to an annualized cost assuming the project were funded with state-issued bonds. The annualized cost is then compared the value of benefits (and costs) that would accrue from the project on an annual basis.

The annual benefits and costs associated with each alternative are considered Project Impacts. These are described in three general categories:

- Quality of Life/Economic;
- Safety; and
- Truck Operations.

As noted in the Purpose and Need Statement, truck operations along Main Street and other roadway segments impact the quality of life for those living, working, shopping or doing business along those roadway segments. It is assumed that mitigating and/or eliminating the impacts of truck traffic will enhance quality of life. In turn, an improved quality of life would translate into higher property values and higher property values would lead to increased property tax revenues. In the downtown area an enhanced quality of life would also translate into increased retail sales and increased restaurant revenues. These benefits were annualized by quantifying the increased tax revenues that would be generated by higher property values, higher retail sales and higher dining revenues. Likewise, for roadway segments that would experience increased truck volumes under Alternative B, anticipated negative impacts on quality of life were determined.

Safety impacts were determined by considering the impact of each alternative on vehicular crash experience. Changing the design of a roadway segment or changing the volume levels will have a predictable impact on the number of crashes. A cash value was assigned to each crash again allowing for annualization of the safety impact of each alternative.

Finally, truck operating costs were considered. Alternatives B and C would both change the route used by through trucks in western Vermont. The longer trip lengths and travel times will impact the cost of each trip. Per mile operating costs for trucks and typical labor rates for truck drivers were applied to calculate annual changes in operating costs for impacted freight movements.

The combined annualized implementation costs were compared to the combined annual impacts/benefits of each alternative to establish a benefit-cost ratio. The benefit-cost ratio allows for objective comparisons among the three alternatives.

The final factors discussed for each alternative relate to risk and timing. Based on the anticipated design, permitting and construction issues associated with each alternative, an opinion is given relative to the likelihood of project implementation (if pursued) and the expected timetable to implement each alternative.

7.1 ALTERNATIVE A – VT 22A TRUCK ROUTE (IN-LINE ALTERNATIVE)

Alternative A, the "In-Line Alternative", includes two components. The first includes physical changes to Main Street (VT 22A) in Vergennes. The suggested Main Street improvements would more safely accommodate pedestrian and bicyclist movements and smooth traffic flow. These actions are expected to enhance the quality of life along Main Street without significantly changing the volume of trucks on this route. The second component consists of supporting strategies that are expected to reduce truck volumes on VT 22A. These strategies are more regional efforts being pursued by the state to divert some freight movements in western Vermont from trucks to rail.

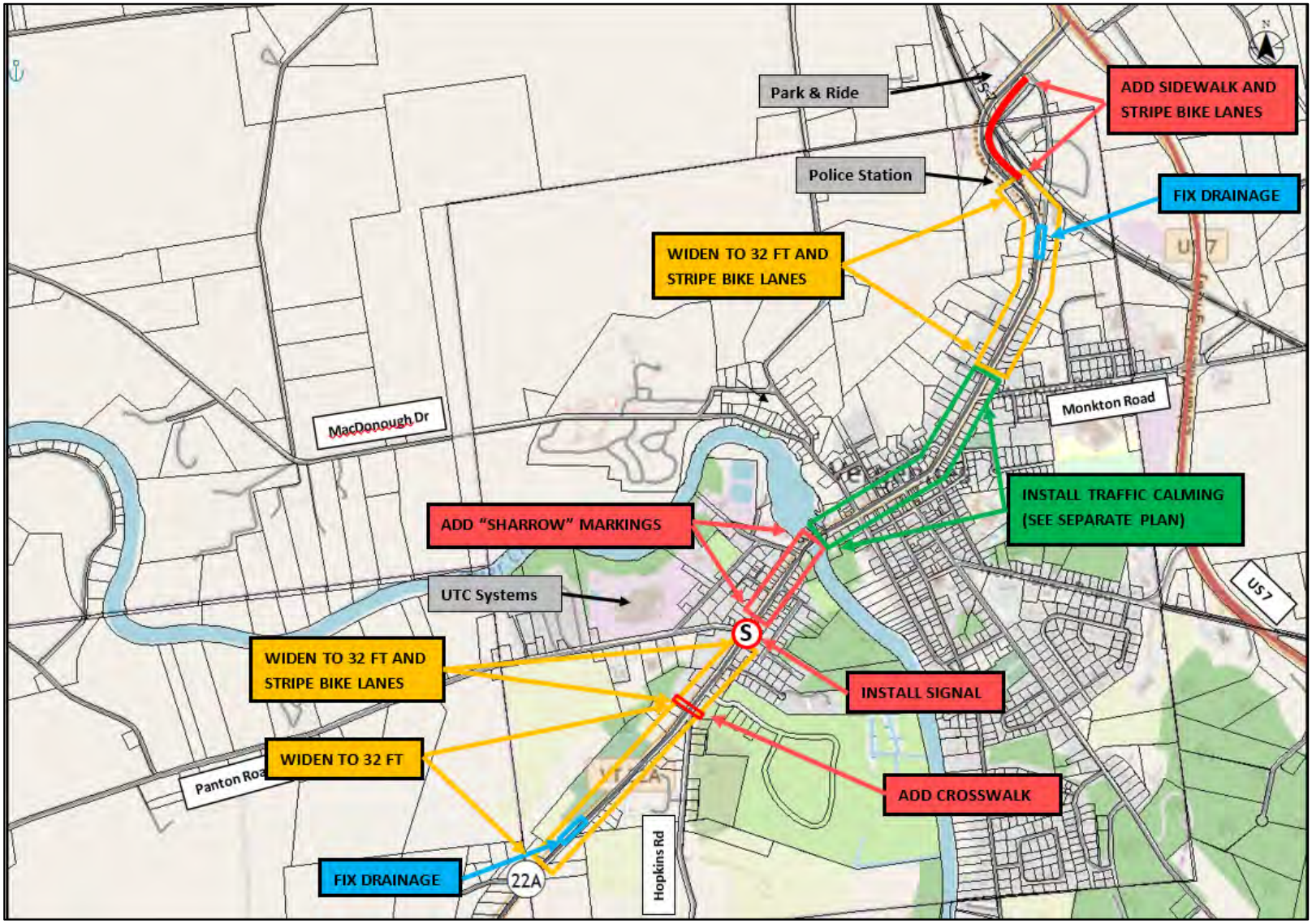
7.1.1 Main Street Improvements

The suggested Main Street improvement program has been developed in cooperation with City staff. The improvements are intended to enhance the safety, functionality and multimodal carrying capacity of the VT 22A corridor through Vergennes in addition to mitigating the quality of life impacts of trucks in downtown Vergennes. The general concept limits any roadway widening to areas outside the urban core where strategies are proposed to create a more pedestrian and bike friendly environment. The program is summarized in Figure 7-1 and described below by roadway segment proceeding south to north along Main Street.

- **Panton Municipal Boundary to Panton Road**-Widen VT 22A from approximately 28 feet to 32 feet to comply with state standards for two-lane rural highways carrying significant truck volumes. (VTrans is undertaking a similar project for southern sections of VT 22A just north of Fair Haven.) Address existing drainage issues along the southern portion of this segment. Provide a crosswalk with warning signs on VT 22A at Hopkins Road. Stripe the roadway shoulders as bike lanes between Panton Road and Hopkins Road. The widening would allow for safer traffic operations and provide accommodations bicyclists and pedestrians.

- **Panton Road/Elm Street/VT 22A Intersection**-Assuming that a decision is made to move forward with Alternative B, signalize this intersection as proposed in a prior study and coordinate this signal with existing signals on Main Street at Green Street and Monkton Road. The signal would reduce peak hour congestion experienced on the Panton Road approach to this intersection and more safely accommodate pedestrian traffic crossing VT 22A. Once the bypass (Alternative B) is completed and traffic volumes are diverted from VT 22A to the bypass, removal of the signal could be evaluated. Should a decision be made not to pursue Alternative B, then construction of a modern roundabout at this location is recommended rather than a signal. The roundabout would also address existing congestion issues and function as a gateway to slow traffic entering the downtown area.

Figure 7-1 Alternative A Plan



- **Panton Road to North Side of Bridge over Otter Creek**-Install "sharrow" pavement markings to remind motorists to share the lane with bicyclists.

- **Otter Creek to MacDonough Drive**-Restripe roadway to provide a northbound (uphill) bike lane. Provide an edge line and sharrow markings for the southbound lane. Reconstruct the Main Street/MacDonough Drive/South Water Street intersection to provide better definition and accommodate safer pedestrian crossings as shown in Figure 7-2. Install traffic signal conduit to support a possible future signal installation.

- **MacDonough Drive to Monkton Road**-This section of Main Street defines the urban core. Along this section the installation of traffic calming measures to more safely and comfortably accommodate pedestrian and bicycle traffic in the presence of the existing truck traffic is proposed. The proposed changes are shown in Figures 7-2a through 7-2d and include:

    - The introduction of curb extensions on Main Street and flush, center median islands at major intersections;

    - The use of textured pavement to provide heightened awareness of crosswalks at signalized intersections;

    - Providing raised crosswalks, enhanced signage, and rectangular rapid flashing beacons at unsignalized pedestrian crossings;

    - Adding "walk/don't walk" signal heads at the existing Green Street and Monkton Road signals;

    - Upgrading controllers and coordinating signals at Green Street and Monkton Road;

    - Installing sharrow pavement markings to accommodate bicyclists; and,

    - Designating a bike route along School Street for northbound travel allowing bicyclists to bypass the diagonal parking stalls and uphill grade along Main Street.

- **Monkton Road to Vergennes Police Station**-Widen VT 22A to approximately 32 feet to comply with state standards for two-lane rural highways carrying significant truck volumes. Address existing drainage issues along the middle portion of this segment (at the "gully"). Stripe the paved shoulders as bike lanes in each direction. The widening would allow for safer traffic operations and provide accommodations for bicyclists.

- **Vergennes Police Station to Ferrisburgh Park and Ride Lot**-Install a new sidewalk connecting to the existing sidewalk on the east site of VT 22A. Stripe the existing paved shoulders as bike lanes.

Figure 7-2a Main Street Traffic Calming Plan (MacDonough to Maple)

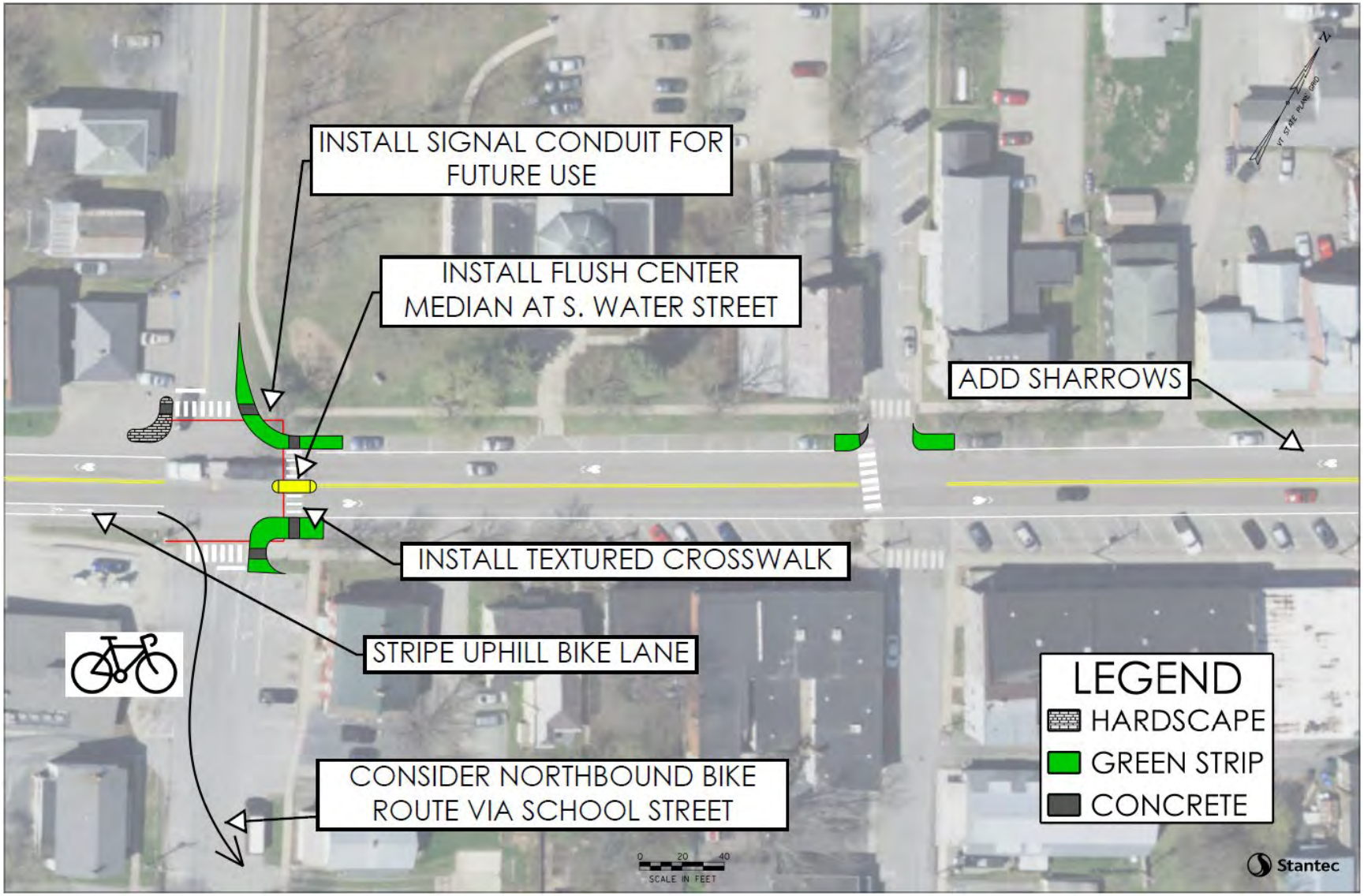


Figure 7-2b Main Street Traffic Calming Plan (Green to East)

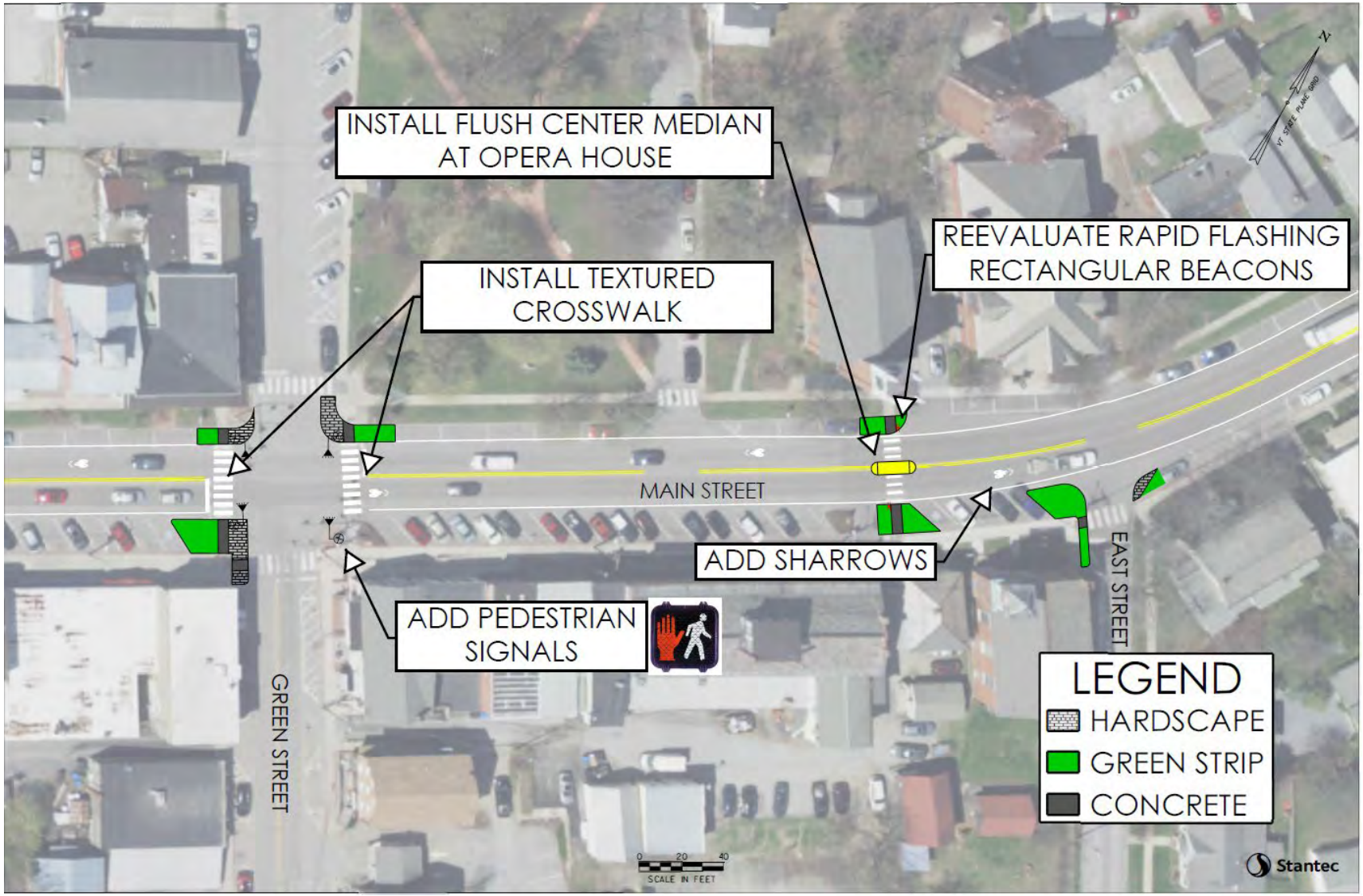
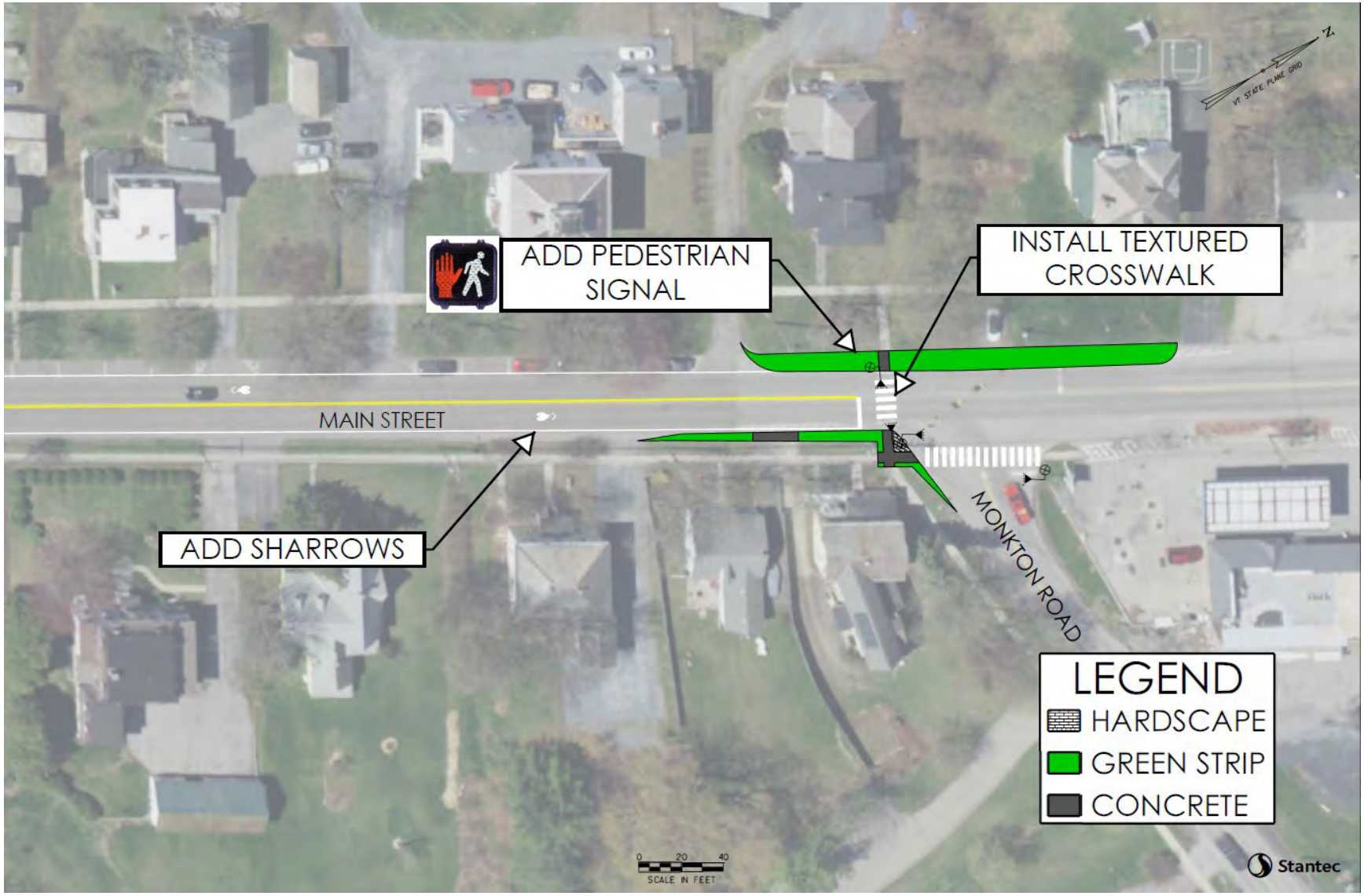


Figure 7-2c Main Street Traffic Calming Plan (School and North Streets)

Figure 7-2d Main Street Traffic Calming Plan (Monkton Road)



Elements of the Main Street program may be constructed by VTrans in 2020 as part of a scheduled Class I Highway paving project. The paving project would extend along Main Street from Ferrisburgh to Panton. Actions that would bring the roadway into better compliance with existing VTrans design standards, such as upgrades to existing crosswalks and the inclusion of pedestrian signals at signalized intersections, are likely to be included in the paving project. Actions that would require right-of-way modifications, such as installing a modern roundabout at the Panton Road intersection, are not likely to be considered as part of the paving project.

7.1.2 Supporting Strategies

The second component of Alternative A could potentially reduce truck traffic volumes on Main Street through downtown Vergennes. Discussions with VTrans and Vermont Rail have identified opportunities to make rail more competitive with trucks for the movement of certain goods in western Vermont. Specifically, Vermont Rail cites a lack of loading and unloading facilities for petroleum products in Chittenden County and in the Port of Albany, New York. The absence of suitable facilities limits the volume of petroleum products that move by rail. Some freight shipments are also restricted by weight limits on the state-owned rail line serving western Vermont. Mainline railroads in the United States generally haul rail cars weighing up to 286,000 pounds. Rail cars on Vermont railroads are limited to a weight of only 263,000 pounds. Consequently, the heavier cars loaded elsewhere cannot travel through Vermont or shippers sending cars to Vermont must underload them adding to shipping costs.

VTrans is in the process of completing structural improvements to the rail corridor in western Vermont that will soon support the travel of 286,000-pound railcars between Albany and Chittenden County. A federal grant was recently awarded to help fund this effort. VTrans has studied the potential impacts of the rail system upgrades and has determined that these improvements could support a shift of 13 percent of the freight moving by truck to rail.

7.1.3 Project Costs

The estimated implementation cost for the Alternative A improvements other than the proposed roadway widenings is $700,000. This estimate includes construction, planning, design and construction inspection services. The proposed widening of approximately one mile of roadway would add $1.2 million to the implementation cost. The unit costs used in preparing the estimates are based on two-year average pricing on other VTrans projects and on recent bid tabulations from projects with similar features. Construction cost calculations are provided in the appendix.

7.1.3.1 Right-of-Way Constraints

Alternative A is limited to improvements that are generally located within the existing Main Street right-of-way in downtown Vergennes. Significant right-of-way costs not expected. The only possible right-of-way issues to be addressed are in the southwest corner of the McDonough Drive/South Water Street/Main Street intersection where pedestrian improvements and new curbing are proposed. Right-of-way risks and delays are very limited for this alternative.

7.1.3.2 Environmental Constraints and Permits

Land abutting the proposed Alternative A improvements is generally developed land and consequently is not expected to be significantly impacted by the proposed actions from an environmental perspective. The proposed improvements include new landscaped areas in downtown Vergennes and drainage improvements elsewhere that may, in fact, help reduce urban stormwater runoff resulting in positive environmental impacts. The proposed roadwork would not significantly impact abutting historic buildings.

7.1.3.3 Amortization

The implementation cost of the Main Street improvements was also calculated on an annual basis. The amortization calculation assumes that the project would be funded with state-issued, tax-free bonds amortized over a 30-year period. It is not anticipated that VTrans would issue bonds to fund the improvements however, this analysis provides a measure of the cost of the improvements on an annual basis. Bonds issued by the State of Vermont in 2017 carried an effective interest rate of 2.48 percent. Applying an interest rate of 2.5 percent and 30-year amortization period for a $1.9 million project indicates an annual cost of $110,000. If the roadway widening proposals are omitted, the annual cost is only $40,000.

7.1.4 Project Impacts

Potential benefits associated with project implementation are quantified below for the three major categories referenced above. In general, the proposed traffic calming improvements would have little or no impact on the volume of truck traffic passing through downtown. The ongoing and potential rail system upgrades may remove a modest amount of truck traffic from Main Street over time. Consequently, this alternative does not substantially mitigate the impacts of truck traffic on downtown Vergennes by removing trucks from this roadway segment. However, the traffic calming improvements would mitigate truck impacts to some extent by creating a more comfortable environment for pedestrians and bicyclists to share the Main Street right-of-way with truck traffic. The improved comfort level and improved quality of life would consequently have a positive impact on the vitality and vibrancy of the downtown. The proposed new traffic signal and signal coordination could reduce the number of starts and stops by trucks in downtown Vergennes. Fewer truck stops and starts would offer some reduction in the noise, vibration, and fume impacts associated with truck traffic. Truck operators may also realize nominal reductions in fuel consumption and operating costs with the smoother flow. The following sections discuss how these impacts were quantified in monetary terms for comparison to the amortized project implementation costs.

7.1.4.1 Quality of Life/Economic

Economic benefits associated with Alternative A relate to the potential enhanced quality of life it would bring to downtown Vergennes. It is assumed that an enhanced quality of life would translate into increased retail sales, increased restaurant revenues, and higher property values. Representatives of the Vergennes Partnership were consulted in developing assumptions relative

to the potential impact Alternative A would have on these factors. (Vergennes Partnership businesses were surveyed by leadership during the conduct of this study to assess opinions regarding truck traffic in Vergennes.) Based on these discussions, it is assumed that Alternative A would have a positive impact on quality of life increasing commercial activity and property values by two to five percent. It was also assumed that the added commercial activity would have a multiplier effect creating even more tax revenues, 20 percent more, as businesses on Main Street purchase goods and services from other area businesses. Assuming such an impact, downtown properties and businesses would generate new tax revenues of $38,000 to $95,000 per year. This analysis is included in the report appendix and a summary is provided in Table 7-1.

Table 7-1 Potential Economic Benefits Associated with Alternative A

		Assumed Change Due to Project (%)		Change Due to Project ($)	
	Existing	Low Estimate	High Estimate	Low Estimate	High Estimate
Downtown Commercial Activity					
Annual Retail/Dining Revenues	$18,000,000	2%	5%	$365,000	$915,000
Annual Retail/Dining Tax Revenue	$1,270,000	2%	5%	$30,000	$76,000
Downtown Real Estate					
Commercial Property Values	$16,750,000	2%	5%	$335,000	$840,000
Real Estate Tax Revenue	$380,000	2%	5%	$8000	$19,000
			Total	**$38,000**	**$95,000**

7.1.4.2 Safety

Anticipated safety impacts of Alternative A were determined using the crash data for the study area presented above in the existing conditions section of the report. The data were used to estimate the total annual cost of crashes in the study area under existing conditions. As shown in Table 7-2 the current cost of crashes for the entire study area is approximately $1.23 million per year.

Table 7-2 Existing Cost of Crashes by Roadway Segment

Segment	Length	2017 AADT	Crashes (2013 - 2017)	Crash Rate	Cost per Crash	Annual Cost of Crashes
Main Street Downtown Vergennes	0.5	9800	57	6.37	$30,000	$342,000
VT 17	7.4	1700	29	1.26	$30,000	$174,000
VT 22A South of Downtown	5.9	5600	51	0.85	$30,000	$306,000
VT 22A North of Downtown	1.0	2500	6	1.32	$30,000	$36,000
US 7	5.4	7550	62	0.83	$30,000	$372,000
TOTAL			**205**			**$1,230,000**

Proposed roadway improvements under Alternative A would impact crash rates in three ways. First, traffic calming measures proposed in the downtown area would reduce crash rates on this roadway segment. Second, proposed widenings of Main Street just north and south of downtown would reduce crash rates on these segments. Third, a new traffic signal at the Panton Road intersection would reduce the number of collisions at this location.

The safety analysis for the downtown roadway segment considers the potential impact of the proposed traffic calming measures. The *Speed Management Toolkit* published by the Federal Highway Administration (http://safety.fhwa.dot.gov/) compiles data from various research studies and indicates that traffic calming programs can reduce crash rates by six to 18 percent. For this analysis it is assumed that the proposed roadway improvements will reduce the crash rate along Main Street by ten percent. Assuming this rate change the annual cost of crashes along the downtown section of Main Street would be reduced by $34,000 (ten percent of $342,000). This represents approximately one less crash per year relative to existing conditions.

The proposed roadway widenings for approximately one mile of roadway immediately north and south of downtown Vergennes would reduce crash rates on these segments as well. As shown in Table 7-2, the 5.9-mile segment of VT 22A south of downtown Vergennes already has the lowest crash rate of any roadway segment in the study area, 0.85 crashes per million vehicle miles (MVM). Much of this segment, in Panton and Addison, already meets VTrans minimum width standards. Consequently, it is assumed that the proposed widenings in the downtown area would result in a low crash rate on these segments as well. It is also assumed that the existing crash rate on the narrower sections of VT 22A just north and just south of downtown Vergennes matches the existing crash reported on VT 22A north of downtown Vergennes, 1.32 crashes per MVM. With the proposed widenings, it is assumed that the crash rate on the one-mile segment of VT 22A just north of downtown Vergennes would be reduced from 1.32 crashes per MVM to 0.85 crashes per MVM. This would indicate a 36 percent reduction in the number and cost of crashes. The annual cost of crashes on this one-mile segment is $36,000. A 36 percent reduction indicates $13,000 in annual saving.

Finally, crashes at the Panton Road/Elm Street/Main Street intersection were considered. Typically, installation of a traffic signal will lower the crash rate at a previously stop-controlled intersection. The *Highway Safety Manual* provides data suggesting that installing a signal will reduce crashes by 44 percent. Crash data compiled for the segment analysis presented above identifies two crashes occurring at this intersection over a five-year period. At an assumed cost of $30,000 per crash, the signal installation would reduce the five-year cost of crashes from $60,000 to $33,6000. The signal installation would consequently reduce the annual cost of crashes by approximately $5000 per year.

The combined impact of the three roadway changes considered indicates and annual crash savings of $52,000 per year.

7.1.4.3 Truck Operations

As noted above, the proposed signal coordination under Alternative A would allow for smoother traffic flow an fewer vehicle stops in downtown Vergennes. However, these benefits would accrue over a relatively short roadway segment. Consequently, it is assumed that this alternative will have no significant impact on truck operations.

7.1.5 Benefit Cost Analysis

The project benefits and costs presented above have been combined and compared. The results of this analysis for the Alternative A are shown in Table 7-3. As shown, the annualized cost of the Alternative A, In-Line Improvements, is $110,000. The accumulated benefits with respect to tax revenues and vehicle crash reduction range from $90,000 to $147,000 per year. As such, the average estimate of the anticipated project benefits exceeds the project cost.

Table 7-3 Benefit-Cost Calculation for Alternative A

Project Cost		Benefits	Low	High	Average
Implementation	$1,900,000	Downtown Sales/Dining Tax Revenues	$30,000	$76,000	$53,000
Amortized	$110,000	Property Tax Revenues (Downtown)	$8,000	$19,000	$13,500
		Subtotal	$38,000	$95,000	$66,500
		Safety (Crash Reduction)	$52,000	$52,000	$52,000
		TOTAL	$90,000	$147,000	$118,500
		Benefit/Cost Ratio	0.82	1.34	1.07

7.1.6 Project Implementation

VTrans is currently designing a resurfacing project for VT 22A in Vergennes. Elements of the Alternative A improvements could be included in the paving project which is scheduled for construction in 2020. City staff are now working with VTrans to define elements that can be incorporated into the paving plans and funded by the state.

Funding sources that should be considered for elements of the In-Line alternative that are not completed as part of the paving project include: Town Highway Grants; Transportation Alternatives Grants; and, Vermont Bicycle and Pedestrian Program Grants. The grant application processes are competitive and applications are judged on several criteria. Projects that meet the intent of the grant, display support from the community, and provide realistic cost estimates and schedules are more successful in receiving grant funding. Timing is dependent upon the readiness of the project for construction, the project cost, and state grant funding levels for the year in which funding is sought. The proposed signal installation at Panton Road is one of the more costly items. This new signal installation may be eligible for state and federal funds. The signal project could be added to the ACRPC Long Range Plan to get it in the queue for these funds. The signal work could then be considered for the VTrans Capital Program.

7.1.6.1 Risks and Timing

Prior to allocating project funding, VTrans must first consider the probability of project completion. Transportation projects are more susceptible to delays or cancelation when there are significant right-of-way and environmental constraints. Alternative A is relatively low-risk as the improvements are mostly contained within the existing highway right-of-way. The improvements are low-impact as they mostly reallocate existing roadway space and do not substantially change the footprint. Proposed roadway changes will not require any known environmental permits.

Project design, right-of-way, and permitting requirements help define project implementation schedules. As noted above, a portion of the In-Line improvements may be constructed by 2020 as part of the state paving project. Remaining elements are relatively low-impact actions suitable for implementation within a three to five-year timeframe. Possible rail system improvements under consideration will likely take longer to implement. VTrans has just received a grant to fund the upgrade of the rail line in this corridor allowing it to carry standard-size freight cars.

7.2 ALTERNATIVE B – ALTERNATIVE ALIGNMENT (TRUCK BYPASS)

Alternative B, the "Alternative Alignment" strategy, includes construction of a new roadway to the north and west of Main Street designed to carry through truck traffic around downtown Vergennes. The roadway design would include: two travel lanes; a minimum 32-feet wide cross section; a 45-mph design speed; and, a maximum grade of six percent to comply with VTrans' standards for roadways carrying significant truck traffic. The 32-feet wide paved section would include 12-feet wide travel lanes and four-feet wide shoulders. Also, the roadway would be

constructed totally within the Vergennes municipal boundaries. A possible alignment for such a roadway is shown in Figure 7-3. This alignment seeks to avoid splitting up parcels in agricultural use. Splitting up larger parcels may create small, isolated parcels that are not cost-effective to farm. The suggested new roadway would be approximately 2.5 miles long intersecting VT 22A just north of the Vergennes/Panton municipal line and again just south of the Ferrisburgh/Vergennes municipal line. A new bridge with a span of approximately 900 feet would be constructed over Otter Creek with an above water clearance of at least 39 feet to allow the safe passage of sailboats between Lake Champlain and marinas in the Otter Creek basin. Any new bridge must meet clearance requirements sufficient to comply with Section 10 of the Rivers and Harbors Act requirements. The new roadway would have STOP-controlled intersections with Panton Road, McDonough Drive and Comfort Hill Street.

Figure 7-3 Alternative B Alignment Plan

Conceptual plans for the new roadway are shown in Figures 7-4 a-f. The conceptual plans show the new roadway intersecting VT 22A at new roundabout intersections. The roundabouts would function as "gateways" to Vergennes as well as accommodating vehicle turning movements. As discussed above, traffic operations at the bypass road intersections with VT 22A were analyzed initially under the assumption that the intersections would be T-type intersections with STOP control on the bypass road approaches. The analyses determined that the assumed STOP sign control would not perform adequately at the northern bypass terminus assuming full development of parcels along the new roadway alignment and that a roundabout or traffic signal would be needed at this location under "full build out" conditions.

The suggested plan represents a possible concept for analysis purposes and is not presented as the recommended plan. Additional planning, public input and environmental permitting would be required to further consider the design concept shown and to develop a recommended plan.

Construction of the new alignment roadway could lead to new development along its length. The new roadway would pass through or near some parcels that are undeveloped, underdeveloped or in agricultural use. Enhanced vehicular access to these parcels would make them more attractive for new commercial or residential development. Assuming that the new roadway would influence the development potential of properties located within approximately 800 feet of its alignment, approximately 930 acres of land in Vergennes, Panton and Ferrisburgh would be affected less land protected by conservation easements.

A wide range of future land use scenarios for the affected parcels is conceivable however, any potential development plans would be controlled by the impacted municipalities. Current Vergennes zoning would support some residential development along northern sections of the new alignment roadway and some commercial development in the vicinity of Panton Road (see Figure 4-26 above). Zoning changes would be needed to allow commercial development on agricultural lands in Vergennes, Ferrisburgh and Panton. For analysis purposes it was assumed that properties in Panton (50 acres) and Ferrisburgh (400 acres) would be developed for commercial uses as noted in Figure 7-5. A mix of commercial and residential uses was assumed for properties in Vergennes. Meetings were held with members of the Vergennes Planning Commission, Mayor Renny Perry and representatives of the Vergennes Partnership to create a future land use scenario for the Vergennes properties that includes 360 acres of commercial development, 55 acres of single-family residential homes and 65 acres of multi-family housing units. The assumed 65-acre multi-family residential parcel is the existing Job Corps site. The assumed land use plan includes new commercial development proximate to the bypass road and new residential development proximate to existing residential uses in Vergennes. Residential properties would be built sufficiently distant from the suggested bypass road such that truck traffic on the roadway would not have significant quality of life impacts at the new residential properties.

Figure 7-4a Alternative B Concept Plan – Section a

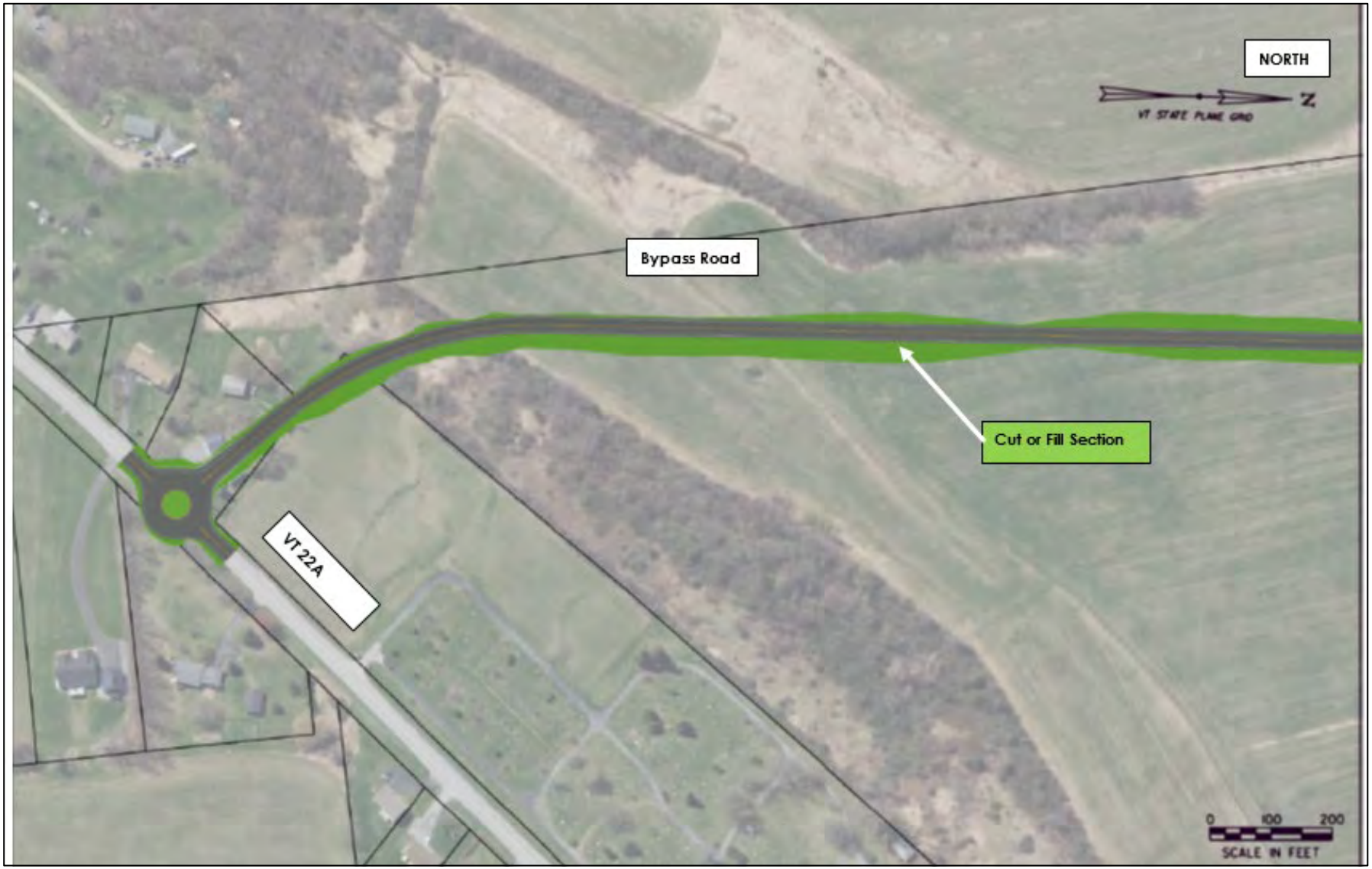


Figure 7-4b Alternative B Concept Plan – Section b

Figure 7-4c Alternative B Concept Plan – Section c

Figure 7-4d Alternative B Concept Plan – Section d

Figure 7-4e Alternative B Concept Plan – Section e

Figure 7-4f Alternative B Concept Plan – Section f

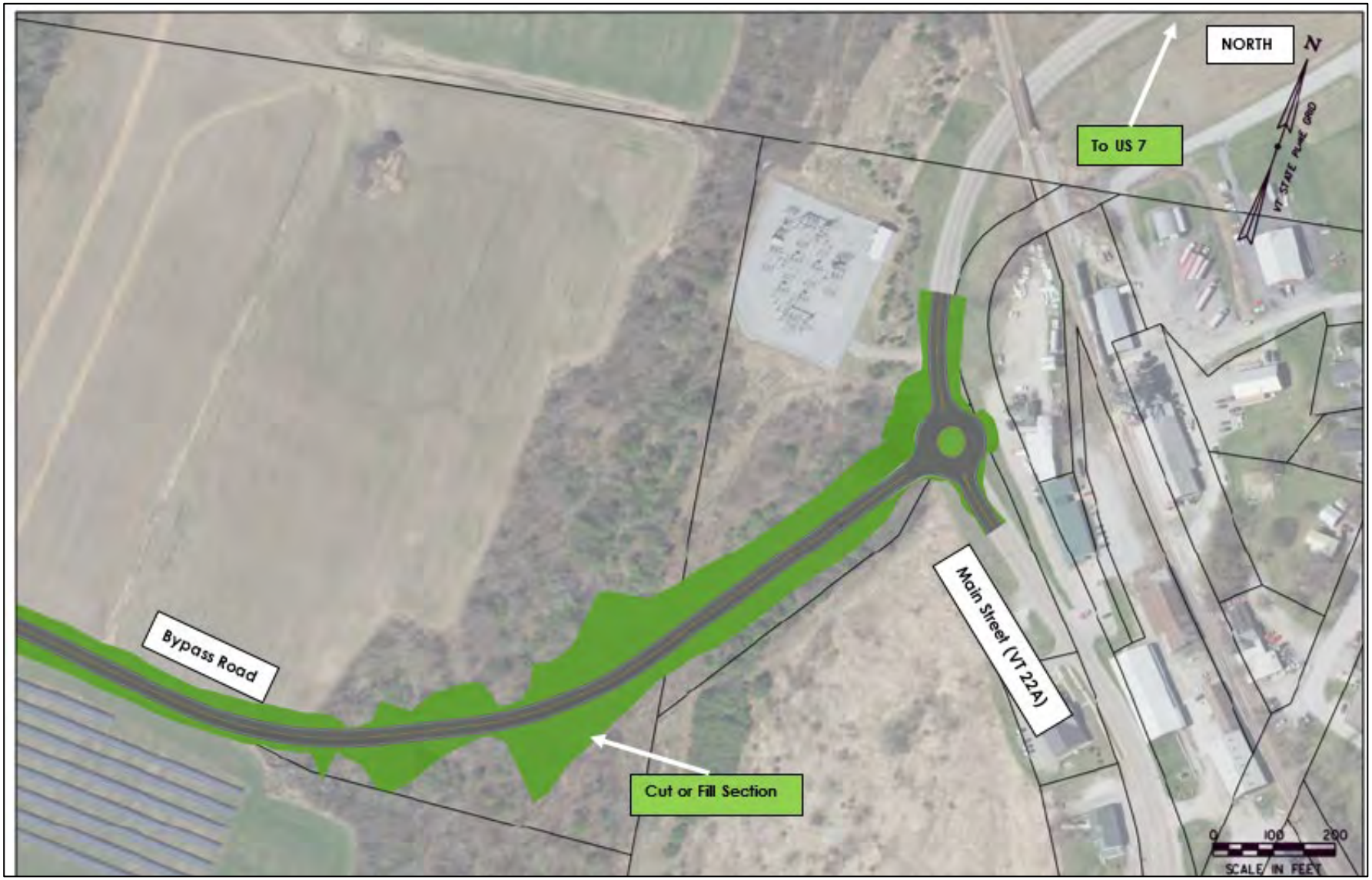
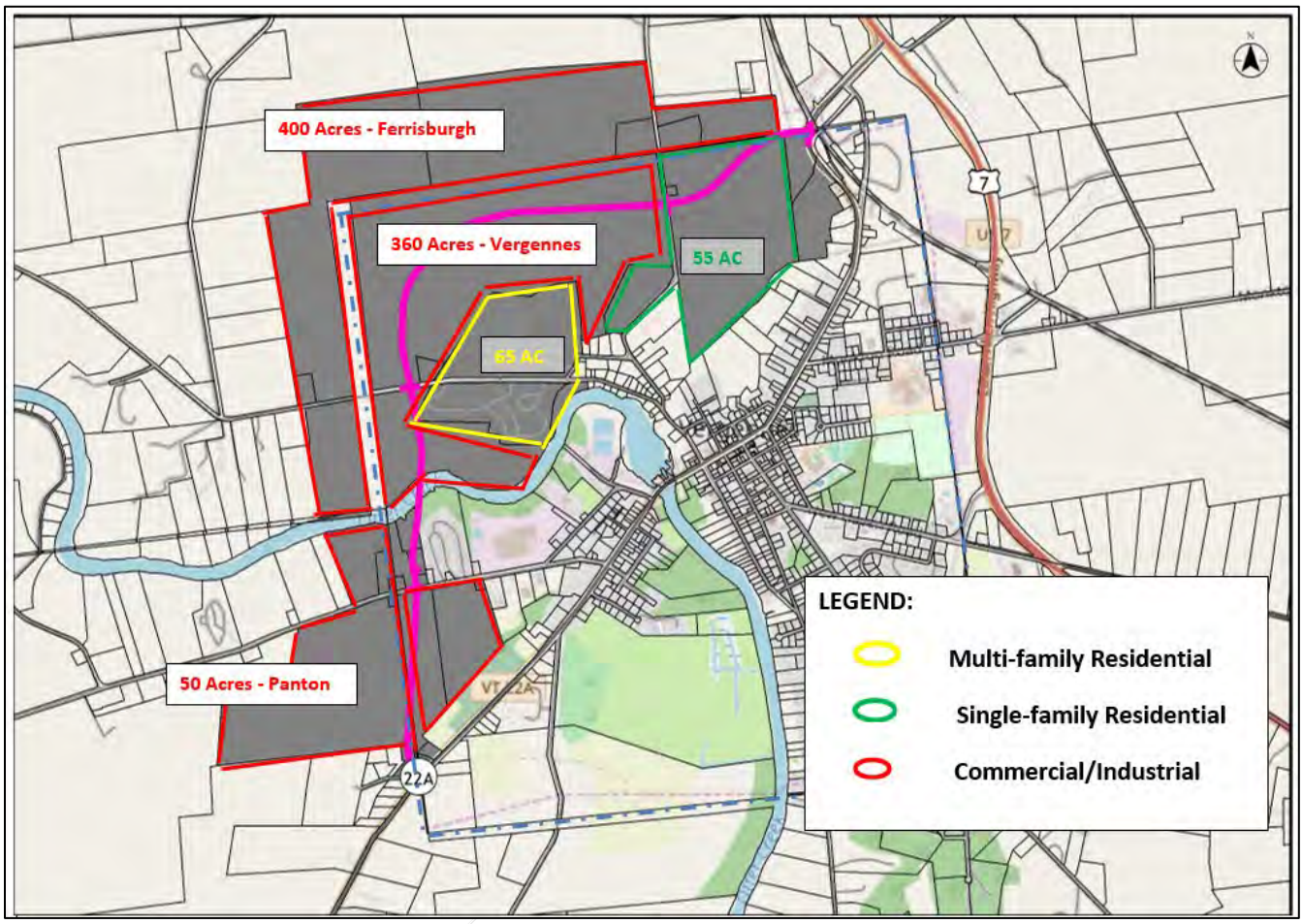


Figure 7-5 Future Land Use Assumptions for Alternative B



7.2.1 Project Costs

Construction costs for the Alternative Alignment plan were prepared using the software tool used to develop the plan. The model provides quantities for major construction items such as roadway excavation, roadway fill, and asphalt. Unit costs are then applied to provide a base estimate. Stantec then compared the model output to unit costs typical of VTrans projects. The estimates for the bridge construction were also closely scrutinized and adjusted to reflect site specific conditions. Finally, the cost estimates were compared to the reported construction costs for the VT 100 bypass recently constructed in Morristown. From this analysis the estimated project construction cost is $27.5 million.

7.2.1.1 Right-of-Way Constraints

The footprint of the New Alignment Alternative right-of-way is approximately 15 acres. The area disturbed for roadway construction, which would include areas regraded under temporary easements, is approximately 25 acres. Most of the impacted parcels are privately owned and

would be subject to the Uniform Relocation Act. The one exception is the Northland Job Corps property which is already state-owned land. Private properties affected along the alternative roadway alignment mostly comprise undeveloped or agricultural acreage. The plan would also impact six existing residential properties. Right-of-way costs of $7000 per acre have been assumed for the non-residential properties. The assumed right-of-way costs for the residential properties are $300,000 each (in current dollars). Based on these assumptions the total anticipated right-of-way cost for this alternative is $2.15 million.

7.2.1.2 Environmental Constraints and Permits

Alternative B will have unavoidable environmental impacts that must be mitigated. Construction of a new roadway and bridge over the Otter Creek, its adjacent wetlands, and floodplains will have direct environmental resource impacts. The project design must seek to minimize these impacts and provide mitigation for unavoidable impacts. Mitigation may include the construction of new, replacement wetlands and floodplains, and/or financial contributions to enhance existing wetland resources. Mitigation strategies must be reviewed and approved at several levels of government. This would include reviews by: the Vermont Agency of Natural Resources through the Vermont Wetland permit process and the Vermont Flood Hazard and River Corridor Permit processes; the Army Corps of Engineers through the Section 10 and Section 404 Permit processes; and, the District Environmental Commission through Act 250.

The Otter Creek crossing and other known, mapped wetland crossings total approximately two acres of direct impact. Assuming mitigation costs of $130,000 per acre (typical of costs associated with similar and recent transportation projects), the wetland mitigation costs for two acres of direct wetland impact associated with Alternative B total approximately $260,000. This figure does not account for any wetland buffer-related impacts or permit application fees.

Another major area of environmental impact relates to takings of land classified by the state as Prime Agricultural Soils and Soils with Statewide Significance. Again, the project design should seek to minimize these impacts and avoid fragmenting farmland via coordination with the USDA Soil Conservation Service and the Vermont Agency of Agriculture, Food and Markets. Unavoidable impacts would need to be mitigated. This is typically accomplished by purchasing and protecting agricultural lands elsewhere. Based on the Act 250 Criterion 9(B) 2018 Off-Site Mitigation Fees, Prime Agricultural Soil mitigation would cost $1,584 per acre in the project area. Alternative B would impact an estimated 20 acres of Prime Agricultural Soils and Soils with Statewide Significance. Assessing these soil impacts as Prime Agricultural Soils, the total “soils” mitigation cost for Alternative B would be approximately $130,000.

Other potential areas of environmental impact relate to rare and endangered species habitat and contaminated soils. Based on the available mapping provided in the existing conditions section of this study, direct impacts to rare bat habitat may result from tree clearing. Additional impacts may be identified during the project design development process. Accordingly, another $200,000 is added to the budget for Alternative B to address unknown issues that may arise in these areas. Combined, environmental mitigation costs for this project are estimated at $600,000.

7.2.1.3 Amortization

The total implementation costs for Alternative B were determined and again amortized to estimate an annual cost for the project. Planning, design, permitting and construction services fees were estimated as a percentage of the estimated construction cost. Combined with the right-of-way and environmental mitigation costs the total estimated project cost is approximately $39 million as shown in Table 7-4. The amortization calculation assumes that the project would be funded with state-issued, tax-free bonds amortized over a 30-year period. Applying an interest rate of 2.5 percent and 30-year amortization period for this project indicates an annual cost of $2,275,000. Added to the amortization cost are annual costs for snow removal, drainage system maintenance and other routine maintenance costs. Also, depreciation costs are included assuming a life expectancy of 50 years for the bridge and 100 years for the roadway. Maintenance and depreciation costs are estimated at $420,000 per year. The total annualized project cost is $2.695 million. Cost calculations are included in the appendix.

Table 7-4 Implementation Cost Summary for Alternative B

Item	Cost
Construction	$27.5 million
Right-of-Way	$2.15 million
Environmental Mitigation	$0.6 million
Planning (5% of construction)	$1.4 million
Engineering and Permitting (15% of construction)	$4.1 million
Construction Engineering (11% of construction)	$3.0 million
TOTAL	**$38.75 million**
Annualized Project Cost	$2.275 million
Life Cycle/Maintenance Cost (Annual)	$420,000
Total Annualized Cost	$2.695 million

7.2.2 Project Impacts

Potential positive and negative impacts associated with project implementation are quantified below. In general, construction of a bypass road is expected to have significant positive impacts with respect to quality of life and the local economy. More modest positive impacts are anticipated with respect to traffic safety.

7.2.2.1 Economic

Economic benefits associated with Alternative B relate to the potential enhanced quality of life it would bring to downtown Vergennes and the new development opportunities it would provide along the proposed new roadway alignment.

The bypass alternative would remove all through trucks, 90 percent of the total truck traffic and 95 percent of the large truck traffic, from downtown Vergennes. The removal of the truck traffic would virtually eliminate truck related noise, emissions, dust and vibration impacts. Safety risks associated with a potential spill of hazardous materials from trucks and trucks stalling on the steep roadway grade in the downtown area would also be eliminated. These quality of life improvements would translate into increased retail sales, increased restaurant revenues, and higher property values in downtown Vergennes. Analyses were conducted to quantify the expected tax revenue impact of these changes in order to annualize these benefits.

Baseline conditions for retail sales, restaurant sales and real estate assessments were defined above. Representatives of the Vergennes Partnership were again consulted in developing assumptions relative to the potential impact Alternative B would have on these factors. Based on these discussions, it is assumed that Alternative B would have a significant impact on quality of life increasing commercial activity and property values by ten to fifteen percent. Again, twenty percent was added to retail and dining tax revenues to account for increased purchases made by downtown businesses. Assuming such an impact, downtown properties and businesses would generate new tax revenues of $190,000 to $285,000 per year. This analysis is included in the report appendix and a summary is provided in Table 7-5.

Table 7-5 Potential Economic Benefits Associated with Alternative B Downtown Vergennes

		Assumed Change Due to Project (%)		Change Due to Project ($)	
	Existing	Low Estimate	High Estimate	Low Estimate	High Estimate
Downtown Commercial Activity					
Annual Retail/Dining Revenues	$18,000,000	10%	15%	$1,832,000	$2,748,000
Annual Retail/Dining Tax Revenue	$1,270,000	10%	15%	$152,000	$228,000
Downtown Real Estate					
Commercial Property Values	$16,750,000	10%	15%	$1,676,000	$2,513,000
Real Estate Tax Revenue	$380,000	10%	15%	$38,000	$57,000
			Total	**$190,000**	**$285,000**

Construction of the Alternative Alignment roadway could also have positive economic impacts from a land development perspective. The new roadway would enhance access to presently undeveloped and underdeveloped properties along its length. New land development would increase assessed land values and tax assessments. For example, much of the land along the proposed roadway alignment is in agricultural use and Grand Lists for Vergennes, Ferrisburgh

and Panton indicate that these lands are assessed at $2000 to $28,000 per acre. The average rate is $8000 per acre. Development of an acre of land with three single-family homes valued at $275,000 each would increase the land value to $825,000 per acre. This approximate ten-fold increase in land value would likewise lead to an approximate a ten-fold increase in property tax revenues. Conversion of undeveloped land or farmland to commercial use would also have significant economic impacts. The 26-acre Collins Aerospace site on Panton Road for example is assessed at $5.2 million or approximately $200,000 per acre.

An assumed future land use scenario was described above and illustrated in Figure 7-5. The assumed land use changes were considered to estimate potential new tax revenues that could be generated by new development. The analysis considered Grand List data for impacted parcels related to: parcel area; existing assessed values; and, associated property taxes. For future conditions, topographic and wetland mapping were examined to estimate buildable acreage for each parcel. Deductions to determine buildable area also consider land lost to construct the bypass roadway and connecting access and subdivision roadways. The detailed parcel-by parcel analysis is included in the report appendix. It notes existing zoning for the affected parcels and assumed future land use conditions. Summary findings are presented in Table 7-6. As shown, assuming redevelopment of all affected parcels, assessed land values along the roadway would increase by approximately $107 million. Estimated new tax revenues generated by this new development are approximately $2.6 million per year. Considering just the Vergennes properties in this analysis indicates an increase in assessed land value of approximately $64 million. The associated net new property tax revenues are $1.8 million annually. The calculated property tax increases represent only a portion of the full economic impact associated with new development. Spending by new commercial ventures and new households will create additional, positive economic impacts.

Table 7-6 Potential Tax Consequences Associated with New Development Along the Bypass Roadway

	Existing Conditions				Future Scenario				
Municipality	Land Use	Size (Acres)	Assessed Value	Annual Taxes	Land Use	Size (Acres)	Assessed Value	Annual Taxes	Net Increase
Vergennes	Agricultural /Undeveloped	362.68	$3,838,213	$87,469	Commercial	156.242	$23,436,300	$550,814	$463,345
	Agricultural /Undeveloped	56.95	$357,700	$8,152	Single-Family Residential	31.18	$25,725,563	$616,333	$608,181
	Job Corps (State Land)	66.00	$16,244,321	$91,000	Multi-Family Residential	39.60	$34,650,000	$830,145	$739,145
					Unbuildable	258.61			
	Subtotal	485.63	$20,440,234	$186,621	Subtotal	485.63	$ 83,811,863	$1,997,292	$1,810,671
Ferrisburgh	Agricultural /Undeveloped	401.00	$1,328,220	$25,182	Commercial	270.80	$40,620,000	$770,115	$744,933
					Unbuildable	130.20			
	Subtotal	401.00	$1,328,220	$25,182	Subtotal	401.00	$40,620,000	$770,115	$744,933
Panton	Agricultural /Undeveloped	52.30	$1,370,100	$26,799	Commercial	37.13	$5,568,750	$108,925	$82,126
					Unbuildable	15.18			
	Subtotal	52.30	$1,370,100	$26,799	Subtotal	52.30	$5,568,750	$108,925	$82,126
	Total	**938.93**	**$23,138,554**	**$238,602**		**938.93**	**$130,000,613**	**$2,876,331**	**$2,637,729**

7.2.2.2 Safety

Anticipated safety impacts of Alternative B were determined by comparing crash costs associated with existing conditions to crash costs associated with improved conditions. For improved conditions, trucks currently passing through downtown Vergennes on Main Street (800 through trucks per day) would be reassigned to the new alternative alignment roadway. The reduced traffic volumes on Main Street and sections of VT 22A just north and south of the downtown area would result in fewer crashes on these segments. Trucks operating along the new alternative alignment roadway would add to the study area crash total.

The annual cost of crashes data for existing conditions presented above is summarized and presented again in Table 7-7. Table 7-7 also shows the expected crash costs with Alternative B. These calculations reflect a shift in truck traffic from Main Street and a one-mile section of VT 22A to the 2.5-mile bypass roadway. The assumed crash rates for Main Street and VT 22A under future conditions are the same as the existing rates. The bypass roadway would be built with a design speed and cross section similar to the design speed and cross section of VT 22A south of Vergennes. Consequently, the existing crash rate for VT 22A south of Vergennes was assumed for the bypass roadway. Based on these assumptions, the improvements proposed under Alternative B would reduce the annual cost of crashes in the study area by approximately $12,000 per year.

Table 7-7 Annual Cost of Crashes with Alternative B

Segment	Annual Cost of Crashes		
	Existing	Alternative B (Alternative Alignment)	Net Change
Main Street Downtown Vergennes	$342,000	$314,082	$ (27,918)
VT 17	$174,000	$174,000	$ --
22A South of Downtown	$306,000	$306,000	$ --
22A North of Downtown	$36,000	$33,000	$(3,000)
US 7	$372,000	$372,000	$ --
Alternative Alignment Roadway	$0	$18,615	$18,615
TOTAL	**$1,230,000**	**$1,217,697**	**$(12,303)**

7.2.2.3 Operations

Alternative B would require that through trucks travel around Downtown Vergennes on the proposed bypass route rather than drive through the downtown on Main Street. The alternative alignment route would be longer, 2.5 miles, than the Main Street route (2.15 miles). The impact of the longer travel route on truck operations was determined.

The operations analysis compared conditions on the existing route on Main Street and along the proposed alternative alignment. Factors considered include:

- Route length;
- Assumed travel speed or speed limit;
- Truck volumes;
- Labor costs for truck drivers;
- Operating costs for trucks; and,
- Anticipated traffic control delays.

The route lengths were defined between the suggested northerly and southerly junctions of the alternative alignment roadway with VT 22A. The distance along Main Street was scaled from available mapping. The distance for the alternative alignment route was derived from the conceptual plan developed. A 40-mph travel speed was assumed for the alternative alignment considering that the roadway would be built to standards for a 45-mph design speed. For Main Street speeds vary by section reflecting posted speed limits of 25 mph downtown and 30 mph just outside of the downtown area. Traffic control delays were assumed for each route. Along Main Street travel delays are imposed by existing signals and delay estimates were determined from the intersection operations analyses presented above. Also, implementation of the Alternative A improvements was assumed as a baseline condition. These improvements add a signal to Main Street at Panton Road however, enhanced signal interconnection and coordination is assumed such that the new signal would not add to the control delay. Along the alternative alignment route, it is assumed that truck traffic would experience 20-second delays at the Panton Road and McDonough Drive crossings and when reentering VT 22A. Assumed operating costs were taken from federal guidance and reflect a $28.60 per hour labor rate for truck drivers and a $0.90 per mile marginal vehicle operating cost. Finally, truck volumes were taken from an August 2018 vehicle classification count for VT 22A conducted 1.2 miles north of VT 17. Approximately 880 daily large and small trucks were counted in 2018. These volumes were increased by 11 percent consistent with the traffic forecasts presented above to reflect future (2043) design conditions. Also, based on the vehicle tracking surveys conducted earlier, it was assumed that only 90 percent of the truck traffic would use the alternative alignment roadway. Local delivery vehicles would be allowed to continue using VT 22A.

Based on these assumptions it was determined that the implementation of the Alternative B would have no significant impact on trucking operations in the corridor. The analysis results, included in the appendix and summarized in Table 7-8, indicate that truck operating costs would increase by a modest amount, $60,000 per year or approximately five percent of the estimated annual operating costs.

Table 7-8 Annual Truck Operating Cost Comparison for Alternative B

Item	VT 22A Route	Alternative Alignment Route
Route Length	2.15 miles	2.50 miles
Annual Vehicle Operating Cost	$596,000	$693,000
Travel Time	5.00 minutes	4.75 minutes
Annual Driver (Labor) Cost	$734,000	$697,000
Total Annual Cost	**$1,330,000**	**$1,390,000**

7.2.3 Benefit Cost Analysis

The project benefits and costs presented above have been combined to calculate a Benefit-Cost condition for Alternative B. The results of this analysis are shown in Table 7-9. As shown, the annualized implementation cost of the Alternative Alignment Roadway is $2.3 million. The accumulated benefits with respect to downtown tax revenues, truck operating costs and vehicle crash reduction range from $142,000 to $237,000 per year. As such, the anticipated project benefits equate to up to nine percent of the annual project cost.

Table 7-9 Benefit-Cost Calculation for Alternative B

Project Cost		Benefits	Low	High	Average
Implementation	$39,000,000	Downtown Sales/Dining Tax Revenues	$152,000	$228,000	$190,000
Amortized	$2,300,000	Downtown Property Tax Revenues	$38,000	$57,000	$47,500
Maintenance & Depreciation	$400,000	**Subtotal**	**$190,000**	**$285,000**	**$237,500**
Total - Annual	$2,700,000	Truck Operations	$(60,000)	$(60,000)	$(60,000)
		Safety (Crash Reduction)	$12,000	$12,000	$12,000
		Total	**$142,000**	**$237,000**	**$189,500**
		Benefit/Cost Ratio	5%	9%	7%

The above calculation does not consider the potential economic benefits associated with the new roadway providing access to land that is presently undeveloped or underdeveloped. As described above, full build-out of all land areas cited in the analysis would generate new annual

property tax revenues of $2.6 million. Combined with the downtown tax benefits cited above, the new tax revenues would approximately match the $2.7 million annual cost of the alternative alignment roadway. If potential new development of just the properties located in Vergennes is considered, the combined benefits would equal 74 percent of the amortized roadway costs.

The economic development benefits assumed are limited to property taxes generated by potential new development. Actual benefits may be substantially larger. A multiplier could be applied to the tax revenue estimates to reflect: new payroll taxes for new employees at the potential new development; increased sales for existing local businesses that would supply the potential new development; and, new sales and meals tax revenues in downtown Vergennes as employees in the new businesses visit downtown Vergennes.

7.2.4 Project Implementation

A new road and bridge of the scale proposed for Alternative B will take approximately ten years to complete after the project is selected and programmed for state and federal funds through inclusion in the AOT Capital Program. VTrans is currently revising its project selection and prioritization process for such projects, which will provide a path for new projects to compete for funding with other needs around the state. The project will have to score well based on eight criteria (safety, mobility/connectivity, asset condition, regional importance, economic access, flood resilience, environment and health access). In addition, there will need to be enough financial capacity so that once it is on the Capital Program, VTrans can carry it through to completion. Funding must be certain for NEPA environmental documentation, design, right-of-way acquisition and ultimately construction. At the time of this report, VTrans has committed funding to a number of long-term projects in the Capital Program and funding for this alternative is not available inside of the five-year budget planning window.

Once the project is added to the AOT Capital Program, the first step will be preparation of an Environmental Impact Statement (EIS), which is the environmental documentation required to satisfy NEPA. The EIS would develop alternative plans, assess potential environmental impacts of each plan, and recommend a preferred plan based on the results of the analysis. Investigations regarding potential wetland impacts, archeological impacts and impacts on historic properties, cited in this study, would need to be developed in much greater detail as part of the EIS. The selected alternative could then move into the design phase. Project permitting would be initiated understanding that the permitting process may help shape the roadway design. Near the end of the design phase work would begin to address right-of-way needs. Project construction could begin once the right-of-way is secured and design plans are in final form.

7.2.4.1 Risks and Timing

This project does contain risks inherent to new roadway construction outside of any existing right-of-way. The right-of-way process is a significant component of the project given the number of landowners involved. The right-of-way process allows for appeals which can impose unanticipated delays and costs.

The permitting required for these improvements will be substantial. As noted above, an Environmental Impact Statement will be required to satisfy NEPA requirements. Both operational and construction stormwater permits will be required. An Act 250 permit will also be necessary. Other state and federal permits will be required as described in Section 7.2.1.2 above. These permit processes involve public input and appeal periods which have the potential to prolong or derail projects.

As noted above, project implementation would require ten years to complete after project funding has been approved. VTrans indicates that project funding is not available within the current five-year capital plan. However, relative to the eight criteria cited above that will be used to prioritize projects, this project should score well in at least six of the categories: safety, mobility/connectivity, asset condition, regional importance, economic access and environment.

7.3 ALTERNATIVE C – VT 17 TRUCK ROUTE

Alternative C, the "VT 17 Truck Route" alternative would restrict the flow of through trucks on Main Street in downtown Vergennes by directing trucks to use VT 17 and US 7 to travel between Ferrisburgh and Addison. As part of this plan, it is assumed that the design issues cited in the existing conditions section of this report would be addressed through reconstruction and widening of much of the roadway. The roadway would be rebuilt for a 50-mph design speed with wider shoulders to more safely accommodate pedestrians and bicyclists. The roadway design would include a minimum 32-feet wide cross section. The roadway would be realigned in some areas to address existing sight line and geometric constraints. Reconstruction would include shoulder widening and resurfacing for the entire 7.5-mile roadway segment and more extensive work, full vertical and horizontal reconstruction, for approximately 4.5 miles of roadway. Even with the proposed improvements it is likely that some short sections of the roadway would still have grades in excess of six percent. Figure 7-6 locates the types of treatments proposed along the roadway. At the VT 17/VT 22A intersection, a roadway widening in the southeast corner of the intersection would be provided to better accommodate trucks turning right from VT 22A northbound to VT 17 eastbound. No improvements are assumed at the VT 17/US 7 intersection.

7.3.1 Project Costs

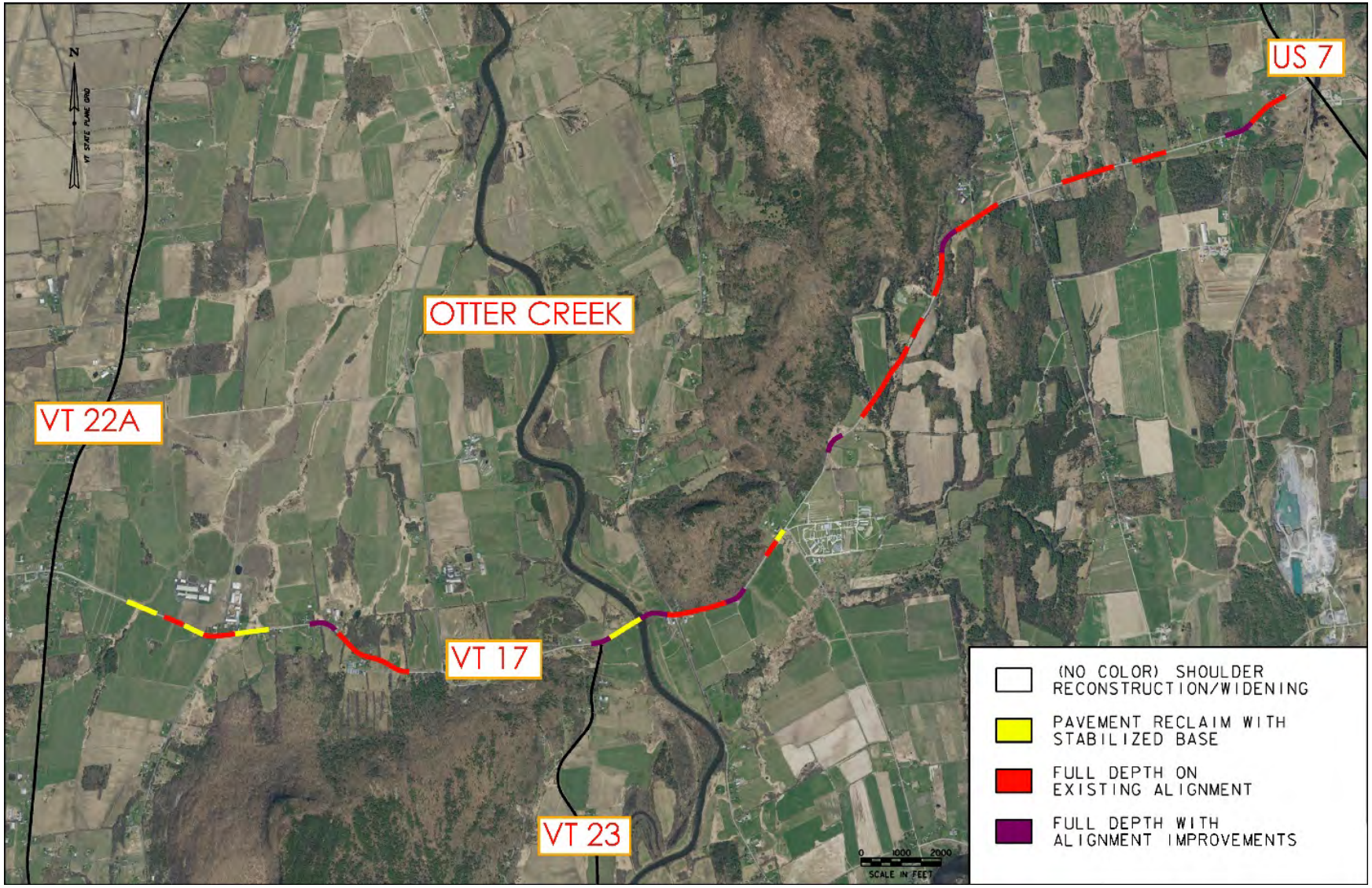
Implementation costs for Alternative C are based on the proposed work along VT 17. As described above, four levels of treatment are assumed for the reconstruction of VT 17. Unit costs (per mile reconstruction costs) for each treatment were obtained from a recent VTrans Project Definition Package prepared for a section of VT Route 22A from Fair Haven to Orwell. This section of VT 22A is being redesigned to address similar design constraints as found on VT 17. The four different levels of improvement and unit costs include:

1. Shoulder Reconstruction/Widening with Culvert Extensions or Replacements - $840,000/mile;

2. Pavement Reclaim with Stabilized Base and Shoulder Widening - $1,180,000/mile;

3. Full Depth Roadway Reconstruction on Existing Alignment - $4,200,000/mile; and
4. Full Depth Roadway Reconstruction with Improvements to Alignment - $5,250,000/mile.

Figure 7-6 Proposed Treatments for VT 17 – Alternative C Concept Plan



The above unit costs include costs for design, permitting, and construction inspection. These costs were applied to the appropriate VT 17 segment lengths to determine the project cost. Another $150,000 was added for proposed improvements at the VT 17/VT 22A intersection. A total project cost of $23 million was determined as shown in Table 7-10.

Table 7-10 Construction Cost Estimate for VT 17 Improvements – Alternative C

Roadway Treatment	Miles Treated	Cost Per Mile	Treatment Cost
Minor Widening	2.97	$840,000	$2,500,000
Pavement Reclamation	0.21	$1,180,000	$250,000
Full Depth Reconstruction	3.17	$4,200,000	$13,330,000
Realignment	1.15	$5,250,000	$6,050,000
Subtotal	7.3		$22,130,000
Intersection Widening (VT 17/VT 22A)	One location	Lump sum	$150,000
TOTAL			$22,280,000
ROUNDED TOTAL			$23,000,000

7.3.1.1 Right-of-Way Constraints

Alternative C will have very limited right-of-way impacts. (The existing right-of-way is 65.5 feet and the proposed roadway width is 32 feet.) Shifts in the roadway alignment are expected at five or six locations where minor right-of-way impacts could occur. The overall right-of-way cost is not expected to exceed $10,000.

7.3.1.2 Environmental Constraints and Permits

In several areas where substantial grade changes to the vertical alignment of VT 17 are proposed, unavoidable environmental impacts must be mitigated. Widening the roadway at stream crossings will require longer culverts and direct impacts to known, mapped wetland resources and related buffer zones. The project design must seek to minimize these impacts and, depending on the scale of the impact, provide mitigation for unavoidable impacts. Mitigation may include financial contributions to enhance existing wetland resources. Mitigation strategies must be reviewed and approved at several levels of government as discussed above relative to Alternative B. Based on mapping of known wetlands and water resources, the direct wetland resources impacted by this alternative total approximately 0.6 acres. Assuming mitigation costs of $130,000 per acre (as assumed for Alternative B), the wetland mitigation costs for Alternative C total approximately $78,000. This does not account for any wetland buffer-related impacts or permit application fees.

Another potential area for environmental impact relates to land classified by the state as Prime Agricultural Soils and Soils with Statewide Significance. Again, project design should seek to minimize these impacts and avoid fragmenting farmland via coordination with the USDA Soil Conservation Service and the Vermont Agency of Agriculture, Food and Markets. Given that this alternative involves widening of an existing road, fragmentation of prime agricultural soils is not a concern. Possible unavoidable impacts must be mitigated. Again, this is typically accomplished by purchasing and protecting agricultural lands elsewhere. Based on the Act 250 Criterion 9(B) 2018 Off-Site Mitigation Fees, Prime Agricultural Soil mitigation would cost $1,584 per acre in the project area. Assuming a ten-feet wide impact on both sides of the entire length of VT 17 for road improvements, Alternative C would impact an estimated 20 acres of Prime Agricultural Soils and Soils with Statewide Significance. This a very conservative estimate as farming does not occur within ten feet of the roadway in most locations. Assessing all of these soil impacts as Prime Agricultural Soils, the total "soils" mitigation cost for Alternative C would be approximately $35,000 in current dollars.

Other potential areas of environmental impact relate to rare and endangered species habitat and contaminated soils. Based on the available mapping provided in the existing conditions section of this study, direct impacts to rare bat habitat may result from tree clearing. Tree clearing would be limited to trees along the roadway edge rather than forested areas. Consequently, impacts should be nominal.

7.3.1.3 Amortization

The total implementation costs for Alternative C were determined and amortized to estimate an annual cost for the project. Planning, design, permitting and construction services fees were estimated at $22.1 million and this figure was rounded up to $23 million to be conservative. The estimated environmental mitigation cost is $113,000 and the estimated right-of-way cost is under $20,000. Combined these costs are much less than the $700,000 added in rounding up the construction cost. Consequently, a total implementation cost of $23 million is assumed. Given the scope and cost of this project, the amortization analysis assumes that the project would be funded with state-issued, tax-free bonds amortized over a 30-year period. Applying an interest rate of 2.5 percent and a 30-year amortization period indicates an annual cost of $1,342,000.

7.3.2 Project Impacts

Potential benefits associated with project implementation are quantified in this section. In general, the project will remove through truck traffic from downtown Vergennes having positive impacts on the vitality and vibrancy of the downtown. The monetary value of these benefits is considered by estimating increases in land values and tax assessments. The removal of truck traffic from other sections of VT 22A will also have positive quality of life impacts on residential properties outside of downtown Vergennes. Negative quality of life impacts would be realized at residential properties along VT 17 where truck traffic volumes would increase. Proposed roadway upgrades however would have positive impacts on road safety along VT 17. Finally, the rerouting of truck traffic, to a longer north/south route around downtown Vergennes, would increase operating costs for truckers.

7.3.2.1 Quality of Life/Economic

Alternative C will bring an enhanced quality of life to downtown Vergennes and properties abutting VT 22A north and south of the downtown area. Negative impacts to property values are anticipated along VT 17.

Alternative C would restrict through trucks from VT 22A between VT 17 and US 7. The removal of trucks would offer economic benefits to downtown Vergennes as described in the discussion of Alternative B. These benefits would extend to other properties along VT 22A outside the downtown area. The benefits outside the downtown area would be less significant. Commercial properties outside the downtown area would likely be unaffected by the truck trip reassignment as these properties, unlike downtown business, are typically set further back from the road, provide on-site parking and do not cater to pedestrian traffic. Residential properties along VT 22A outside of the downtown area are likewise set back much further from the road than residential properties in the downtown area. Removing trucks and their associated noise, emissions, dust and vibration impacts from VT 22A will have a less significant impact on residential properties outside of the downtown area compared to downtown properties. Similarly, the negative quality of life impacts associated with adding truck traffic to VT 17 will be more muted compared to these impacts in the downtown area.

The results of the downtown quality of live/economic impact analysis for Alternative B apply to Alternative C. The removal of truck traffic from downtown would increase annual retail sales, dining and alcohol taxes by $152,000 to $228,000 per year. Real estate taxes would increase by $38,000 to $57,000 per year as noted in Table 7-11.

Table 7-11 Potential Economic Benefits Associated with Alternative C

		Assumed Change Due to Project (%)		Change Due to Project ($)	
	Existing	Low Estimate	High Estimate	Low Estimate	High Estimate
Downtown Commercial Activity					
Annual Retail/Dining Revenues	$18,000,000	10%	15%	$1,832,000	$2,748,000
Annual Retail/Dining Tax Revenue	$1,270,000	10%	15%	$152,000	$228,000
Downtown Real Estate					
Commercial Property Values	$16,750,000	10%	15%	$1,676,000	$2,513,000
Real Estate Tax Revenue	$380,000	10%	15%	$38,000	$57,000
VT 22A Real Estate – Outside of the Downtown Area					
Residential Property Values	$20,700,000	2%	5%	$414,000	$1,035,000
Real Estate Tax Revenue	$435,000	2%	5%	$9000	$22,000
VT 17 Real Estate – VT 22A to US 7					
Residential Property Values	$9,500,000	-2%	-5%	-$190,000	-$480,000
Real Estate Tax Revenue	$200,000	-2%	-5%	-$4000	-$10,000
			Total Tax Revenues	**$195,000**	**$297,000**

Residential properties along VT 22A outside of downtown Vergennes would experience increased property values and generate higher property tax revenues under Alternative C. Grand List data from Vergennes, Panton and Addison were compiled for these properties. A total of 115 residential properties were identified representing 160 acres of developed land valued at $20.7 million. Applying a "blended" tax rate of $2.10 per $100 in assessed value, (tax rates vary in each municipality), the residential properties generate annual tax revenues of $435,000 per year. Assuming a two to five percent increase in property values due to the removal of truck traffic, the assessed values of these properties would increase by $400,000 to $1 million and annual tax revenues would increase by $9000 to $22,000.

The benefits realized along VT 22A would be offset, in part, by negative impacts to residential properties along VT 17. Residential properties along VT 17 between VT 22A and US 7 would

experience decreased property values and generate lower property tax revenues under Alternative C. (No impact to residential properties along US 7 between VT 17 and VT 22A is assumed. This roadway segment would also experience an increase in truck traffic under Alternative C, however, given the existing volumes of truck and all vehicular traffic on US 7, the added truck traffic may not measurably impact residential property values.) Grand List data from New Haven, Waltham and Addison were compiled for affected properties along VT 17. A total of 34 properties were identified representing 99 acres of developed land valued at $9.5 million. Applying a tax rate of $2.10 per $100 in assessed value, the residential properties generate annual tax revenues of $200,000 per year. Assuming a two to five percent decrease in property values due to the addition of truck traffic, the assessed values of these properties would decrease by $190,000 to $480,000 and annual tax revenues would decrease by $4000 to $10,000.

7.3.2.2 Safety

Anticipated safety impacts for Alternative C were determined by comparing crash costs associated with existing conditions to crash costs associated with proposed conditions. For proposed conditions, trucks currently passing through Downtown Vergennes on Main Street (800 through trucks per day) would be reassigned to VT 17 and US 7. The reduced traffic volumes on Main Street and VT 22A between US 7 and VT 17 would result in fewer crashes on these segments. Trucks operating along VT 17 would add to the study area crash total.

The annual cost of crashes data for existing conditions presented above is summarized again in Table 7-12. Table 7-12 also shows the expected crash costs with Alternative C. These calculations reflect a shift in truck traffic from VT 22A to VT 17 and US 7. Also, the assumed crash rates for all roadway segments under future conditions are the same as the existing rates with one exception. The rate for VT 17 was lowered to match the rate for VT 22A south of Vergennes reflecting proposed geometric/safety changes that would be made to VT 17 under Alternative C. Based on these assumptions, the improvements proposed under Alternative C would reduce the number of crashes in the study area and the annual cost of crashes by approximately $37,000 per year.

Table 7-12 Annual Cost of Crashes with Alternative C

	Annual Cost of Crashes		
Roadway Segment	**Existing**	**Alternative C (VT 17 Truck Route)**	**Net Change**
Main Street Downtown Vergennes	$342,000	$314,082	$ (27,918)
VT 17	$174,000	$172,189	$ (1,811)
22A South of Downtown	$306,000	$262,286	$ (43,714)
22A North of Downtown	$36,000	$32,000	$ (4,000)
US 7	$372,000	$412,216	$40,216
TOTAL	**$1,230,000**	**$ 1,192,772**	**$(37,228)**

7.3.2.3 Operations

Alternative C would require that through trucks use VT 17 and US 7 to avoid travelling through Downtown Vergennes. This alternative route between the VT 17/VT 22A intersection in Addison and the VT 22A/US 7 intersection in Vergennes is longer than the existing route preferred by truckers on VT 22A through Vergennes. The impact of the longer travel route on truck operations was determined in the same manner as was done for Alternative B.

The operations analysis compared conditions on the existing route (VT 22A) and along the proposed alternative route. With the proposed upgrades a speed of 45 mph was assumed for travel on VT 17. A 50-mph speed was assumed for US 7. Along VT 22A south of Vergennes a 50-mph speed was also assumed. Trip lengths are 7.5 miles on the existing route and 12.7 miles on the alternative route. Along the VT 17/US 7 route, travel delays (60 seconds total) are assumed for the signal at the Monkton Road/US 7 intersection and for stop signs that would be encountered (depending upon the travel direction) at the VT 17/VT 22A intersection in Addison and the VT 17/US 7 intersection in New Haven.

Based on these assumptions, and others that were documented above for the analysis of Alternative B, it was determined that the implementation of the Alternative C would significantly impact trucking operations in the corridor. The analysis results, included in the appendix and summarized in Table 7-13, indicate that truck operating costs would increase by approximately, $2.2 million per year or by approximately 60 percent of the estimated existing annual operating costs.

Table 7-13 Annual Truck Operating Cost Comparison – Alternative C

Item	VT 22A Route	VT 17/US 7 Route
Route Length	7.5 miles	12.7 miles
Annual Vehicle Operating Cost	$2,080,000	$3,520,000
Travel Time	11.7 minutes	17.2 minutes
Annual Driver (Labor) Cost	$1,720,000	$2,530,000
Total Annual Cost	**$3,800,000**	**$6,050,000**

7.3.3 Benefit Cost Analysis

The project benefits and costs presented above have been combined to in Table 7-14 for Alternative C. As shown, the annualized cost of to rebuild VT 17 is approximately $1.3 million. The combined "benefits" with respect to tax revenues, truck operating costs and vehicle crash reduction are on the order of negative $1.9 million per year. The negative value is a direct consequence of the added cost of freight movement on VT 17. Ignoring truck operating costs, the net benefits are $232,000 to $334,000 per year which equates to approximately 17 to 25 percent of the annual project cost.

Table 7-14 Benefit-Cost Calculation for Alternative C

	Cost	Benefits	Low	High	Average
Implementation	$ 23,000,000	Downtown Sales/Dining Tax Revenues	$152,000	$228,000	$190,000
Amortized	$ 1,342,000	Property Tax Revenues	$38,000	$57,000	$47,500
		Subtotal	**$190,000**	**$285,000**	**$237,500**
		Property Tax Revenues - VT 22 Outside Downtown Vergennes	$9,000	$22,000	$15,500
		Property Tax Revenues - VT 17	($4000)	($10,000)	($7000)
		Subtotal	**$5,000**	**$12,000**	**$8,500**
		Truck Operations	($2,250,000)	($2,250,000)	($2,250,000)
		Safety (Crash Reduction)	$37,000	$37,000	$37,000
		TOTAL	**($2,018,000)**	**($1,916,000)**	**($1,967,000)**
		TOTAL Excluding Truck Operations	**$232,000**	**$334,000**	**$283,000**
Benefit/Cost Ratio (TOTAL)			-150%	-143%	-147%
Benefit/Cost Ratio (TOTAL Excluding Truck Operations)			+17%	+25%	+21%

7.3.4 Project Implementation

The scope of work proposed for Alternative C ($23 million) is on a comparable scale to the work proposed for Alternative B ($39 million). Consequently, the implementation process for Alternative C will be comparable to the process for Alternative B. However, since the work will generally occur along an existing highway alignment the environmental permitting and right-of-way elements will be less complex. Again, it will take approximately ten years to complete the project after it is selected and programmed for state and federal funds through the AOT Capital Program. The project will be subject to the new VTrans project selection and prioritization process cited above. Once selected and prioritized, the project will be eligible funding when available. As noted above, VTrans has committed funding to a number of long-term projects in the Capital Program and funding for this alternative is not available inside of the current five-year budget planning window.

Once the project is added to the AOT Capital Program, project design and environmental permitting could begin. Design concepts will consider potential wetland impacts, archeological impacts and impacts on historic properties. Project permitting would be initiated understanding that the permitting process may help shape the roadway design. Near the end of the design phase work would begin on the right-of-way needs for proposed changes in the roadway

alignment. Project construction could begin once the right-of-way is secured and design plans are in final form.

7.3.4.1 Risks and Timing

The risks associated with Alternative C are mainly limited to right-of-way issues. As noted above however, the new right-of-way necessary is limited to properties where alignment shifts would be required. Another concern relates to the proximity of historic properties to the roadway. A complete inventory of historic properties has not been conducted. Should such properties be impacted by the proposed realignment changes this could alter the project design. Most likely, design modifications could be considered to address any historic impact or right-of-way issues.

The total length of time to implement Alternative C is estimated at 13 to15 years. Again, given the limited environmental impacts associated with work within an existing roadway alignment, the permitting process may be two years shorter than the process for Alternative B. Project implementation would require eight-to-ten years after funding is approved. Funding for the project however, would not be available within the next five years based on VTrans' current commitments.

7.4 EVALUATION SUMMARY

The analyses conducted of each of the alternatives were summarized and compared. Figure 7-7 presents the project cost, project impact, feasibility and benefit/cost data for each alternative. As noted, Alternative A, the In-Line alternative is the lowest cost alternative and easiest to implement. The total project cost is approximately $1,900,000 and it could be implemented in two to five years. Elements of the plan may in fact be constructed by VTrans within the next two years. Since Alternative A does not divert significant truck traffic from downtown Vergennes, the quality of life/economic benefits derived from this alternative are not as substantial as those associated with the other two alternatives. However, the value of the benefits associated with this alternative exceed the costs. The benefit/cost ratio is 1.08.

Alternatives B and C would remove all through truck traffic from VT 22A in downtown Vergennes and consequently provide significant and positive quality of life/economic impacts. The estimated value of these downtown benefits is nearly $240,000 per year. The costs to achieve these benefits however are an order of magnitude greater than the costs associated with Alternative A. The implementation cost for Alternative B, the Alternative Alignment alternative, is approximately $39 million and the cost for Alternative C, the Route 17 Truck Route alternative is $23 million. Both projects would take at least eight years to complete. Alternative B, while more expensive than Alternative C, has the potential to stimulate new development and provide significant economic benefits over time. The new land development that could occur along the new alternative alignment roadway would generate tax revenues nearly equal to the cost of this alternative. Ignoring potential new development impacts, the benefit/cost ratio for Alternative B is 0.08. Alternative C does not support economic impacts outside of downtown Vergennes. Also, under Alternative C, the rerouting of truck traffic from VT 22A to VT 17 would increase shipping costs by more than $2 million per year. The higher shipping costs would likely

be added to the cost of goods shipped placing a burden on consumers. When these costs are considered the benefit/cost ratio for Alternative C is a negative number.

Figure 7-7 Evaluation Summary

Catergory	Alt. A	Alt. B	Alt. C
Project Implementation Costs			
Construction	$ 1,900,000	$ 27,500,000	$ 17,500,000
Design & Permitting	included in construction	$ 8,500,000	$ 5,390,000
Land Acquistion	nominal	$ 2,150,000	$ 10,000
Mitigation	$ -	$ 600,000	$ 100,000
TOTAL (Lump Sum)	$ 1,900,000	$ 38,750,000	$ 23,000,000
TOTAL (Annualized)	$ 110,000	$ 2,700,000	$ 1,285,000
Project Impacts (Annualized)			
Economic-Downtown	$ 66,500	$ 237,500	$ 237,500
Economic-Outside of Downtown	$ -	$ 2,600,000	$ 8,500
Safety (Crashes)	$ 52,000	$ 12,000	$ 37,000
Truck Operations	$ -	$ (60,000)	$ (2,250,000)
TOTAL	$ 118,500	$ 2,789,500	$ (1,967,000)
Feasibility			
Probability of success	Very High	High	High
Timing	2 to 5 years	10 to 15 years	8 to 12 years
Benefit/Cost Ratio			
Base Case	1.08	1.03	-1.53
Modified*	1.44	0.07	0.22

* For Alternative A it is assumed that one quarter of the implementation cost is covered by the planned Class I Paving Project.
For Alternative B it is assumed that the economic benefits occurring outside of the Downtown are omitted form the calculation.
For Alternative C it is assumed that the truck operations impacts are omitted from the calculation.

8.0 RECOMMENDATIONS

The alternatives analysis indicates that both Alternatives A and B represent worthwhile investments to address the project purpose and need. Alternative B, the Alternative Alignment plan, is a large project (estimated $49 million value) that will take ten to 15 years to complete. However, it will provide very substantial and positive impacts for downtown Vergennes virtually eliminating all truck traffic passing through on Main Street. Downtown property values, retail revenues and dining revenues are expected to increase significantly with the truck traffic removed. The value of potential new development that could occur along the new roadway could reach $130 million. New tax revenues generated by this level of development would approximately match the annualized cost of the new roadway. This project would likely score very well against the large project prioritization criteria currently being developed by VTrans.

Accordingly, it is recommended that the City of Vergennes, the Addison County Regional Planning Commission and its member communities formally endorse this proposal and petition VTrans to include it in its Capital Program. The suggested roadway should be added to the City Plan and opportunities to make other public investments to support economic development along the new alignment roadway should be explored.

Given the extended timeframe to implement Alternative B, and the opportunity to immediately make certain Main Street improvements as part of planning VT 22A repaving project, it is recommended that the City, ACRPC and member communities also formally endorse and pursue funding for the Alternative A improvements. These proposed improvements will not substantially change the volume of truck traffic in downtown Vergennes however, they would create a more comfortable environment for pedestrians and bicyclist circulation. This added comfort level should also provide a slight stimulus to downtown businesses. Even the modest economic stimulus assumed in this study results in a positive benefit/cost ratio for Alternative A. Most importantly, the Alternative A improvements can be implemented in as little as a five-year timeframe providing near-term relief from the impacts of truck traffic.

Pursuit of Alternative C, the VT 17 Truck Route alternative, is not recommended at the present time. The cost to implement this alternative, $23 million, is less than the cost of Alternative B and it would have the same positive impacts on truck traffic in downtown Vergennes as Alternative B. However, this alternative would also take ten to fifteen years to implement and it does not provide any notable support for new economic development in the area. More importantly, it has substantial negative impacts on truck operations forcing truckers to travel a longer route than desired. When the added transportation costs are considered, this project has a negative benefit/cost ratio. This alternative would also have negative quality of life and property value impacts along VT 17.

9.0 COMMUNITY OUTREACH

Throughout the conduct of this study a project website and email address were maintained to receive public comment. However, comments were predominantly received via two public meetings. The first meeting held in September 2018 included a presentation of existing conditions data and a description of the alternatives under investigation. Attendees at the meeting voiced their concerns regarding the impacts of trucks on downtown Vergennes and the need to move the truck problem to other communities. A second hearing was held in April 2019 to present the results of the alternatives analysis and the consultant's recommendations. The hearing was preceded by an hour-long "open house" inviting one-on-one conversations between the public and members of the project team.

At the close of the April 2019 public meeting the audience was asked to express their opinions regarding the three alternatives considered. The community overwhelming supported implementing the in-line alternative, Alternative A, in coordination with the planned VTrans paving project to alleviate the truck issue in the short term. The community also recognized that the in-line alternative does not remove trucks from downtown and then overwhelmingly

supported the new roadway alignment alternative, Alternative B. Recognizing the significant economic development potential associated with Alternative V, the mayor of Vergennes renamed Alternative B as the Vergennes Economic Corridor. Minutes from the two public hearings are included in the report appendix along with written comments received on the study.

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